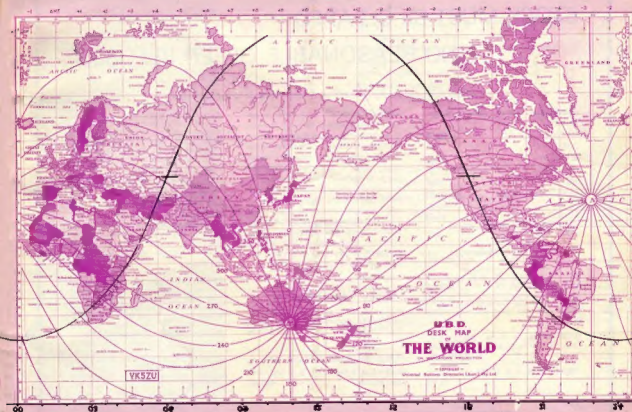


amateur radio

NOVEMBER, 1973



VK5 SPECIAL ISSUE

- A WIDE-BAND PRE-AMP FOR THE FTD401 AND FT200
- MOBILE ANTENNA FOR 40
- THE THEBARTON PROJECT
- AN ANTENNA FOR 160 METRES
- "S" METERS FOR AMATEUR RECEIVERS
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FRONT COVER:

Mercator map of the world marked with great-circles based on Adelaide
with bearing increments of 15 degrees. Black curves show solar ter-
minator at 22nd July.
(See article on page 14).

The Executive has heard rumours and misinformed comments about the 2m and 70cm bands. A member of the Executive saw senior officials at a joint meeting on 10th October to establish facts.

The re-opening of the FM Broadcasting enquiry by the Minister for the Media, has led to speculation about our vhf-uhf bands. This is because "x" number of MHz in the spectrum is required for this new service. Internationally the FM broadcasting band runs from 88 to 108MHz but the ABCB Report on the subject could not recommend this in Australia because of TV channels 4 and 5. Instead 470-510MHz was preferred with 500-540MHz as the next best. The band width of 40MHz was suggested as desirable.

A fresh Enquiry on the subject is expected to be announced soon for a Report to be made to the Minister in the New Year. The Executive will of course make submissions because once again all the VHF and UHF frequencies will come under scrutiny — ALL the frequencies and not solely the amateur bands. Everything points to the continued exclusive use of our entire 2m band but nevertheless, because it is in the vhf area, it will be looked at.

The technical administrators clearly state there are no intentions against our 2m band and none could be supported. One or two isolated MHz are of little use in the context referred to above.

The status of the 70cm band however is different. Amateurs have 420-450MHz on a secondary basis and here are 30MHz not too far away from 470MHz. The primary user in this part of the spectrum is probably too deeply entrenched to be molested in any way. The Executive however has set up a Committee to look at this band. We have no exclusive use of any frequencies between 148MHz and 24GHz but this seems to be of little concern to anybody else because of the severe pressures on the available spectrum. The last Space Conference showed all too clearly how the amateur service needed support.

The public in Australia do not hold 'Hams' in much favour either. The adverse and often ignorant press and other publicity has seen to this. Commercial interests also could wield a powerful lobby.

The Federal Council and the Executive are able and willing to engage in battle. Are you ready to assist in every way you can? To always operate and behave responsibly, reasonably and intelligently and encourage others to do the same **MUST CONTINUE TO BE THE WATCHWORD.** Improve our image in the eyes of the public. Use our frequencies to the full.

Unfortunately there is a minority refusing to conform. Their unconformity could be our undoing under the pressures building up around us.

John McL. Bennett, VK3ZA.

Most of the articles in this edition of "Amateur Radio" have been supplied by the South Australian Division. This was not done to bolster our ego (after all, we know we are the Division with the mostest!), but to prompt other Divisions into supplying a similar batch of material for subsequent issues.

"Amateur Radio" is our only printed link. We claim to be competent communicators, but how many people in other Divisions know of activities such as our headquarters project.

At this year's Federal Convention it was suggested that perhaps VK2 could supply copy for February, VK3 March, VK4 April, and so on, finishing with VK9 for September. While this would be an ideal situation for the magazine committee, it is probably an impossible dream.

Or is it?

Perhaps you could give the suggestion further thought while reading through our efforts. We hope you enjoy them.

The VK5 Division.

SPEED OF LIGHT.

QST for June 1973 quotes from Optical Spectra that NBSL scientists have concluded that light travels at a velocity of 299792.4582 Km per second ± 1.1 metres. This is equivalent to 186282.3960 miles per second ± 3.6 feet. This is almost the time taken for bad news to travel around Australia.

Historical.

"The article '50 Golden years of Broadcasting' (Aug. '73 AR) was of particular interest to me, being one of the original staff of 6WF in 1924 when the station operated on 1250 metres and 104.5 metres. Wally Coxon, VK3AG and Bill Phipps VK5WP were the engineers."

(Note from VK5MY of Atkin Carlyle Ltd. of Perth).

Interference

"The APO at the request and expense of the Board, investigates causes of interference to the reception of broadcasting and television programmes and furnishes advice and assistance to listeners and viewers as to how these troubles might be minimised. During the year ended 31 May, 1973 16,422 complaints (4032 bc and 12390 TVI) complaints were lodged. The cost of investigating complaints to 30 June, 1973 was \$233,858". Australian Broadcasting Control Board 25th Annual Report for year ended 30 June, 1973.

THE AMATEURS.

"What good are amateurs?" — "What do they do?" — "Can they serve any useful purpose?" The quick answer is, of course, that the mere fact of their being nearly 550,000 in the world of the West as a whole, is by itself a good enough reply to these questions. If no

benefits flowed or advantages accrued from the pursuit of Amateur Radio, it could not possibly exist on such a scale — and continue to expand at the rate it does. Editorial Short Wave Mag. July '73.

RADIO STATION STATISTICS.

At 30th June 1973 there were 6563 licensed amateurs showing an increase of 41 in the 6 month period to that date. Licensed mobile stations however increased by 17,771 to 155,110. Of the 6476 continental VK stations 4419 were full calls and 2051 restricted licences; 2045 (1450 full and 595 limited) were in NSW, 2012 (1295 — 717) were in Victoria, 758 (525 — 233) in Queensland, 748 (500 — 248) in S. Australia, 516 (373 — 143) in W. Australia, 224 (148 — 76) in Tasmania and 117 (88 — 29) in ACT with 50 (40 — 10) in the NT, 93 (80 — 13) amateurs were listed as being in the territories of whom 81 (68 — 13) were in TPNG.

The Thebarton Project

VK5 Division of the Wireless Institute of Australia

Rarely is the Wireless Institute associated with world famous architects. Such a momentous event is taking place in VK5, where the Division is in the process of converting a building designed by Walter Burley Griffin into the Divisional headquarters. The following article describes the trials and tribulations of firstly, obtaining a building, and secondly, converting it.

For some fifteen years the VK5 Division has been putting the profits from disposals and equipment sales into a Building Fund. Like many such funds, the growth of the fund has been far slower than the rise in building prices and it looked as if we were doomed to meet in rented halls for ever, as well as relying on members good graces to store equipment in their homes. In 1969 two or three members

started private investigations into possible sites for headquarters buildings. After several different proposals had been followed up, the matter was put to the general membership, and at a Special General Meeting in mid-1971 a committee was appointed to determine our requirements and find a suitable home for us.

This committee, commonly known as the Headquarters Committee, was chaired by Rob Wilson SWA. To this day Rob is not sure how he was landed with the job, but the committee worked magnificently and the results are a credit to its members. Heaven only knows how many properties they looked at, from private houses, through bakeries, to disused churches. Bear in mind that the Building Fund stood at less than \$3000, which limited their bargaining powers somewhat. One rather attractive offer of a block of land 66ft x 460 ft fell through when we found that we were expected to erect a \$20000 building with no guarantee of continued tenancy.

After six months of hard work, the committee hit the jackpot — the Thebarton Council indicated that they were prepared to

offer us their municipal rubbish destructor building. When the raucous laughter died down we found that we were being offered an architectural masterpiece designed by Walter Burley Griffin, the man responsible for the initial planning and design of Canberra. While in Australia to work on the Canberra project, Burley Griffin also carried out other architectural and town planning jobs, including several municipal rubbish destructor buildings.

The building we were offered consists of three floors (see sketch) and an attached room. Although it does not have a room suitable for general meetings (the largest area will take about 800 at a squeeze), it was considered that the rented hall in the Adelaide city area was satisfactory for these, while the building could be used for VHF, YRCS, SWL and WICEN meetings. The separate attached room was ideal for SWL, while the top floor was earmarked for a YRCS lecture room. One of the most attractive features was a 50ft. high chimney on which to mount the beams and terminate long wires.

BELOW — The chimney at Thebarton, shortly due to be topped with beams for 20 metres and higher.

BELOW — Burley Griffin believed, amongst other things, in making his buildings solid. That hole represents two hours work with the jack hammer.





hand lanterns peering through odd holes in the brickwork and climbing round inside the furnace flues, and the problem was solved. To get into the chimney, go down, young man, through the basement floor. One flue channel below the floor led directly into the chimney. Granted, the opening was only about three feet wide and two feet high, but it was big enough for a man to get through and stand up inside the chimney.

Although the chimney is square on the outside, this is only a disguise for the actual, round, chimney inside. Brickwork was cheap in 1937, and the round chimney did not fit the design of the building. The internal diameter of the chimney is about 4ft, and a ladder will be built, from 5ft sections, inside it so we can erect the aerials: (five feet sections are the largest it is possible to fit through the flue opening). We will assemble it inside the chimney and fasten it to the wall as it goes up. Two of our older members have offered to pre-fab the sections at home and to deliver

BELOW — Burley Griffin believed in making even the most mundane building beautiful.



ABOVE — Secretary Ross VK8KF signs the lease for the new HQ building under the eagle eyes of Rob VK8WA chairman of the Building Committee, and Geoff VK6TY, Divisional President. Barry VK6ZAU ensures the occasion is suitably recorded in the minutes.

Negotiations were commenced with the Council, and after 15 months, largely due to delays in the preparation of lease documents, we were the proud possessors of a BUILDING, on a ten year renewable lease, annual rental \$15!! And what a building.

Work started on the Sunday after Easter 1973; the first jobs being to throw out all the movable junk and remove the soil which had been dumped against the building since it was last used in 1957. Having tossed out all the smaller items (nothing over 300 lbs in weight) into the conveniently located pug-hole outside the back door, we tackled big headache number one — the furnace.

Sitting sullenly in the middle of the basement floor, this consisted of a steel box 16ft by 12ft by 8ft high, filled, or so it seemed, with firebricks. All the edges and corners were reinforced with 3" x 3" angle, the sides braced with back to back 6" x 3" channel, and the whole lot bolted together with 1/2" nuts and bolts with the bolt heads concealed on the inside. One Saturday afternoon with an oxy-cutter and the nuts were removed from the end nearest the pug-hole. Four weeks later the pug-hole was full of firebricks, the steel plate was cut into manageable sections and stacked ready for removal, and we could see the length of the basement.

The chimney, future support for massive beams and long wires, presented a totally different problem. We could not find a way into it! Several nights work with torches and

them ready to be erected in the chimney by some of the younger, more agile members. Conveniently, there is a small flue that feeds into the chimney just below the floor of the 5WI room, so the coax cables will not have to disappear into the basement first.

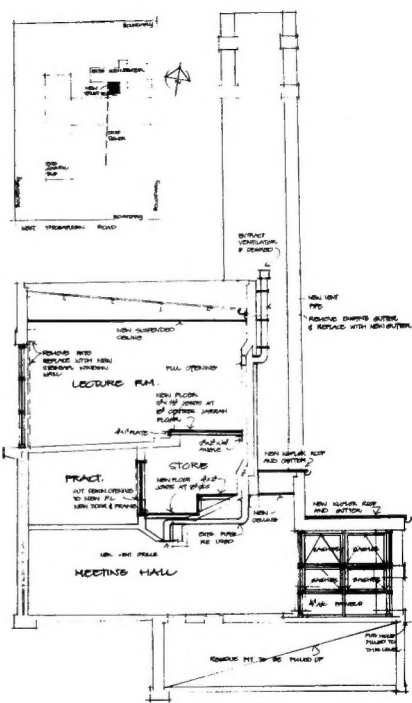
To guide our work we had a set of plans drawn up by Bruce Bussenschutt, VK5OR of Turner, Bussenschutt and Associates who spent considerable time deciphering prints of the original drawings and turning them into a form suitable for interpretation by radio amateurs. The only errors we have found so far have been due to incorrect information on the original drawings; minor things such as showing the internals of the furnace to be mirror images of the final product. Bruce just smiled, made the necessary adjustments, and left the bill at zero.

All jobs have their ups and downs. Who would have thought that the 9 ft high brick retaining wall was actually a brick-faced, 9" thick, reinforced concrete structure, and was located just where the toilet block had to go. That caused a certain amount of blood, sweat and pure Australian language, but eventually it succumbed. The ceiling of the basement was jet black with soot and bituminous residue from the furnace. Burning off with blow lamps was only partially successful, but one Sunday the workers borrowed the Council's fire hose to clean the floors and found that the ceiling muck washed off if hit hard enough with a jet of water. In about an hour we had a clean ceiling, and so far nothing has reappeared from within the concrete. The same technique is working marvels elsewhere in the building, and the time saved cannot be estimated.

On-the-spot supervision and coordination of the effort has been the responsibility of Barry Williams 5ZBQ, and Geoff Taylor 5TY. Supervision in this sense is interpreted as; "If there's no-one else available, do it yourself, mug". So far about 50 members have assisted on the job, ranging from junior associates to Roy Cook 5AC, who held a licence before World War I, and makes an admirable gatekeeper to keep out undesirable and let in the workers. Till now all the work has been voluntary, but we are in the process of sub-contracting out the erection of the toilet block as this requires certain specialized trades and will be built much quicker by weekday labour.

The Thebarton Council has been more than cooperative. Not everyone would allow a team of radio amateurs unrestricted access to their property at all hours of the night and day, and more important make equipment such as concrete mixers, tractors, air compressors and wheel barrows available without charge. Without their assistance the job would have been harder and more expensive. With only weekends available we must work just that little bit harder and one Council worker commented "The way your mob get stuck into it, we wouldn't be surprised if one Monday morning we found the whole building turned round to face the road". The building would look better that way, so . . .

We hope to have the basement room ready for meetings by mid-November, and to complete all essential work on the rest of the building by late January. After that, of course, come the finer details, like the



Building plan of the floor layout

establishment of a garden in the old pug-hole. While the work will probably never be finished in the 5WI room (another transmitter, better audio gear, etc.) we will at least be in our own home and working for ourselves.

IMPORTANT NOTICE

As announced in "Amateur Radio" individuals may apply to the Department of Customs and Excise for By-Law on a H.F. Transceiver.

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communication in the VK5 division

Geoff Taylor, VK5TY, Federal Councillor.

"In any division there is always the problem of passing information on to the members. As radio amateurs we are expected to be experts in communication, but radio is not necessarily the best way of passing on information. In VK5 a two-pronged attack is made using radio, via the Divisional broadcasts and the printed word in the *Divisional Journal*. Both have their problems but these are not insoluble to keen amateurs."

No Division can function without some form of communication among the members. Most members seem content with what they hear from other operators on the air, but there is always a need for some form of formal communication. The Divisional broadcast is one form of communication, but not everyone is in a position to hear it because of other commitments. To ensure that information is available to all members, some form of printed sheet is necessary.

In VK5 we make maximum use of both outlets. As we have no headquarters building as yet, all the work is carried out in members' homes. This involves considerable liaison and cross-town travelling.

The Divisional broadcast is prepared by Ian 5ZKT and Adrian 5AW. They arrange the program, edit taped submissions, arrange

interviews, and tape the entire session ready for playback on the Sunday morning. The tape is complete with cue-ing and tune-up signals for the relay stations, and identification pauses. It is delivered to Bart 5GZ who is the official 5WI operator. The program originates from Bart's home on 1.8 MHz AM using a Viking transmitter purchased by the Division some time ago.

The 1.8 MHz signal is received and relayed by various members on the other bands. Due to the geographic layout of the VK5 Division, from Mount Gambier in the South to Darwin in the North, Renmark in the East to Ceduna in the West, no one frequency can hope to supply an adequate cover. The relays are on 3.5MHz AM by Murray 5ZQ; 7.0MHz AM by Ross 5KF; 14MHz SSB by Geoff 5TY; 52MHz AM by Bob 5MM; 144MHz by John 5AWI; and FM Channel 4 by Jim 5NB.

Additionally there are relays on 2 metres in Darwin by Colin 8CM and Mount Gambier by Colin 5DK. Each relay station takes a callback after the broadcast with the exception of the FM Channel 4 transmission. We also have a number of stations that stand-by to substitute for the regular operators at holiday time and during other absences.

For the written word we have the SA Divisional Journal. This is a duplicated, foolscap sized magazine issued at least six times a year to all members of the VK5 Division. Minimum size for several years has been 8 sheets (16 pages) and lately it has been running something like 12 sheets per issue. The Journal contains technical articles (some of which are reprinted in this copy of

"Amateur Radio"), Oscar predictions, VHF and SWL notes, Federal notes, official communications from Council, general Divisional information, members advertisements, and last but not least, details of items available from the Equipment Supply Committee. We also include paid advertisements from local trade organizations.

Again, as with 5WI all the work associated with the Journal is done in private homes. Editing and printing is carried out by Tom 5QP on the Institute's duplicator set up in the kitchen. Bob 5MM as Technical editor rewrites articles and draws circuit diagrams to his own high standards. Address plates are looked after by Ross 5KF, and the addressing is done by Junior Associate, Marian, under the eye of Geoff 5TY.

Journal assembly is organised by Wally 5TW who gathers a group of "volunteers" at his home, wearing out his carpet while tramping round the table picking up sheets, and then eating (and drinking) him out of house and home. The Journals are then bulk posted to members.

We are fortunate that John 5UL was successful in obtaining a Class A postal permit for the Journal as this reduces the postage to a reasonable sum. As it is, by the time the extra amount is paid for airmail delivery to VK8 members, the bill for 600 copies is about \$13.

The Journal is now in its fourteenth year. Over this period it has had several editors and printers, the most outstanding service being by Brian 5CA and his wife Marlene who, for eight years, typed, edited, printed and collated the Journals at their home, as well as printing the wrappers. Marlene's greatest worry always being that she might not have enough supper for the collators — an entirely unjustified fear.

With the possibility of a headquarters in the near future we hope to extend and enlarge the coverage of both 5WI broadcasts and the Journal. It is the efforts of volunteers in these activities which has made the VK5 Division what it is today — the best informed and most active Division in Australia! ●

1973 AUSTRALIAN RADIO AMATEUR CALL BOOK

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● Continuously up-dated through Ball's Inserts in AR—this service is available only to members.

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ABOVE — Colin VK8CM at Darwin takes the 20 metre relay of VK5WI and retransmits it on 2 metres for the Darwin group. Reception is by a TH3 beam to a FTDX100 receiver. The audio is then fed to a TCA1675 and from there to a beam.

a wide-band pre-amp for the FTDX 401 and FT 200

Kerry Adams, VK5SU

Lambert Street, Caduna, 5690

This wide band amplifier is suitable for many modern transceivers including the Yaesu F series. No originality is claimed; it is a combination of circuits and ideas drawn from many sources.

Using 9 volt positive regulated supply from the FTDX401, the gain is slightly below unity at 3.5MHz, while rising to 10dB at 15MHz (12dB is obtainable with a 15 volt supply). The gain falls slowly to unity at 54MHz. I find that the FTDX401 is quite satisfactory up to 21 MHz requiring only 30-35 microvolts RF CW in to produce an S9 signal. At the other end of the scale, 28MHz requires between 60 and 80 microvolts to achieve the S9.

My preamplifier was built on a small bit of vero board, 8 holes by 11 holes and laid out like the circuit. The only adjustment is to the midget trimmer capacitor C1. Tune up the transmitter on about 28.6 MHz, and do not touch the pre-selector tuning control after tuning up the unit. Then peak C1 for maximum RF noise on a signal generator or antenna. This capacitor compensates for the lower input capacitance of the TIS88 compared to the 6BZ6.

The 100pF capacitor from the RF amplifier switch to the 6BZ6 grid is lifted off the grid and run to the preamplifier. The 1000PF output from the OC170 then goes to the 6BZ6 grid.

No cross modulation has been observed to date even from an FT200, yards away, or an FTDX560 200 yards away in the same street. All of us can operate to within about 20KHz on any of the HF bands with only slight desensitisation with Yaesu gear.

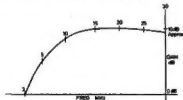
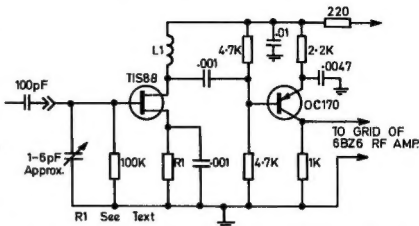


FIG 2 - RESPONSE OBTAINED USING SWEEP GENERATOR

Many FT401 owners have noticed that the 2MHz spread of 28MHz does not track too well. I fixed mine by the addition of a 3-30 midget trimmer between the RF amplifier switch position D, and earth (4 switch positions are in parallel). Approximately all the capacitance is required. Check across the range while retuning the capacitor and aerial coil. The transmitter and receiver pre-selector tuning is now identical, even if the gain on 28MHz has dropped a little in the process of acquiring proper tracking. This makes the pre-amplifier even more desirable. ●



WIDE BAND PRE AMP FOR THE FTDX401 - FIG 1

R1 220 ohms nominal, values increased via a spare wafer on band change switch in FTDX401 so that gain of pre-amplifier is altered to suit band in use, i.e. more resistance gives less gain.

L1 8 turns of bell wire round a pencil.

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extraordinary convention

The Extraordinary Convention held in Melbourne on 15th and 16th September dealt mainly with 2M repeater frequencies as briefly reported in QSP of last month's AR. The opportunity of holding discussions with all Federal Councillors was too good to be missed and was used to maximum advantage.

One outstanding question was the constitutional position arising out of the formation of the A.C.T. Division and that Division's application to join the Federal body. The thinking on this crystallised during a debate on such Constitutional matters as the absence of proportional voting provisions about which additional work was commissioned. Many problems affecting AR were discussed at length including the impending increases in postage rates and the continuing improvements in organisation which are going on all the time as well as those which have been noted for implementation within the most stringent financial limitations imposed upon the Executive.

Another matter which has been, and still is, the subject of great thought is the vexed question of Convention costs and how to keep these at the lowest possible level consistent with the essential function of meeting together to transact business.

Among the other matters discussed was the use of our EDP system to greatest advantage. This affects members in relation to such areas as subscriptions processing, AR addressing labels and membership cards. EDP also bears heavily on the small Executive office engaged in a multitude of other functions necessary to the administration of the central organisation. ●



Tony Mulcahy VK2ACV, Don Miller VK2GN (Alternate FC), Ian Mackenzie VK2ZIM (observer), Russell Kelly's nose VK3NT, Peter Williams VK3JZ (observer), Peter Zinden VK3BX (observer), Ian Binnie VK2ZIU (observer), Lawrie Blagbrough VK4ZGL.



Left to right, Ted Cruise VK7EJ (with glasses and cigarette), Kevin Connelly VK3ARD, John Bennett VK3ZA, the WIA PR expert, Peter Dodd VK3CF, Michael Owen VK3KI, David Wardlaw VK3ADW, Federal President, Jack Martin VK3TY, Vice-President.



Tony Mulcahy, 2 visitors in the background, Geoff Taylor VK8TY, Ian Champion VK5W8 (observing), Neil Penfold VK8NE, Phil Fitzherbert VK3HF (observing), Peter Frith VK7PF (observer) and Ted Cruise.

an antenna for 160 metres

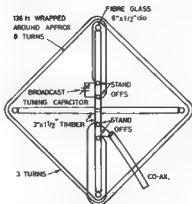
Reprinted from South Australian Wireless Institute Journal October 1972.

The antenna to be described has shown improved results over the various dipoles and long wires that had been used in the past. Compared with the other antennae, this one shows a couple of "S" points.

I have been able to copy K4SGU at 559, and VK5DV's signal, which was not so strong here at Bagakave, is now up another couple of "S" points.

The antenna is basically a one element yagi with a tuned winding and a low impedance link.

To construct the antenna you will need 2 pieces of timber 6" x 3" x 13' to form the cross, 136 ft. of 20-22 s.w.g. enamel wire to form the main tuned winding, and enough 20-22 s.w.g. enamel wire to wind on three turns to form the link. Four pieces of glass fibre rod, about 1/2" diameter and 6' long from an old fishing rod, four small stand off insulators to terminate the ends of the wire and a single gang



160 METRE ANTENNA

broadcast type capacitor (mounted as close as possible to the stand off insulators) are also needed.

The construction of the antenna is as follows. Screw the two pieces of timber together to form a cross, and across the ends of the timber screw the four pieces of fibre glass rod. Attach one end of the 136 ft length of wire to an insulator, these insulators having first been mounted in pairs as shown in the diagram. Wind on all the wire and attach the end to the adjacent insulator. This will be about eight turns. Now wind on the three turns, attaching the ends to the other set of insulators.

Mount the single gang condenser to the boom as close as possible to the stand-offs that are connected to the 136 ft length of wire, and connect to the ends. Attach 70 or 50 ohm co-ax to the ends of the three turn link and the antenna is ready.

The final step is to peak the capacitor for maximum signal strength and the antenna is then complete. ●

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Further 2 Metre equipment, Ken, Beicom, Swan & Yagi antennas, check September/October ads. Also, 12V DC 3-3.5A regulated 240V power supplies **\$26** only.

All prices quoted are net cash basis Springwood N.S.W., pre-paid with orders, sales tax included in all cases, subject to change without prior notice. Freight, postage, now much dearer than before! Packing and insurance are extras, sorry, no terms, credit or C.O.D. Proprietor Arie Bles.

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mobile antenna for 40

Les Diener, VK5NJ/M

Reprinted from South Australian Wireless Institute Journal May 1973.

Mobile antenna systems certainly present a never ending field for experiment, and whether used on the V.H.F. or Low Frequency bands, such will have some merit and de-merit.

The conventional centre loaded type is without question as good as any, both from a "short-haul" and DX standpoint. However, this type of mobile antenna (particularly on the low frequency bands) has the following disadvantages:

1. Critical construction and adjustment including attachment to the vehicle, and a means of stowing in the vehicle when not in use.
2. Deflection, particularly when travelling at high speed or in a strong head wind. This causes the resonant frequency to change slightly as the top section is pulled away from the metal of the vehicle. This effect is most severe when using a meta caravan.
3. Sharp tuning and narrow band width, usually ± 15 kHz "Q" resonance
4. Height above the vehicle.

With some reservations, the well known "helical" overcomes most of these problems quite well, and, if accurately tuned and matched to the transmission line, performs comparably to the centre loaded type.

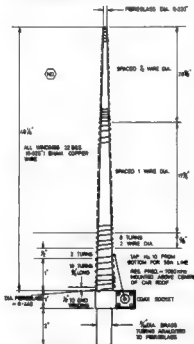
Over recent years, my efforts with helicals have not, until now, been comparable with results using a centre loaded system. However, when noting the excellent signals from various other mobile users using helical whips one cannot but agree with their posibilities.

At this point, I pay tribute to Hughie, VK5BC, who has done a great deal of experimenting with L.F. mobile antenna systems, and has given me many useful hints and tips which have largely accounted for my success with the helical described in this article. Vern, VK5VB, has also done a great deal of experimental work with helicals for portable operation where total height is of no importance, and with very satisfactory results. But this antenna is primarily intended for mobile operation, total height above the vehicle being only 4 feet.

For the interest of "home-brew" types like myself who want to go mobile on 7 MHz details are given of the actual construction used, but variables, such as diameter of the fibreglass rod, rate of taper, etc., will determine the changes necessary in final tuning. However, provided the resonant frequency and matching are accurately adjusted, performance should be the same. Being strictly a monoband antenna, separate antennas of this type will be needed for each band chosen, but the 40 metre version may be used as a guide.

PERFORMANCE

1. Operation up to 40 kHz either side of the resonant frequency is quite feasible without encountering high V.S.W.R. problems. (This is not possible with centre loaded types.)



2. A contact with JASAFU/MM, 900 miles south of Adelaide at RS57 was made (other contacts within the normal 40 metre range appear about equal to those made in the past using a centre loaded antenna of 8ft. length).

3. The helical antenna may be left mounted on a bar over the vehicle roof, and raised or folded down as required

4. The total height above ground is 8 feet 9 inches.

5. S.W.R. when correctly matched is 1.1 to 1.

Finally salutations go to Phil, VK5NN, for his R.F. noise bridge data (ref. A.R. July and October 1971), for matching to 50 ohms was possible to the "nth" degree using the bridge I have constructed to Phil's amended detail using a pair of 2N3693's.

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CLUB/ZONE/DIVISION NEWS

- The Publications Committee wishes to advise that the call on AR for space to print material is so great it is not possible to include a section devoted to Divisional, Zone or Club news.

- Arrangements were made with all Divisions that such news would appear in Divisional Bulletins if so required, and accepted by Divisional Bulletin Editors. Bulletins, when submitted, are carried as inserts in AR mailed to members of the Division concerned.

- It has been agreed however that AR should include an Events Diary to contain very brief details of forthcoming events. Items for this Diary MUST reach the Editor not later than the 1st of the month prior to publication.

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Having recently joined the ranks of those who operate rotatable beams on the HF bands, the writer took a critical look at the generally accepted methods of direction-finding and decided to explore the feasibility of using the well known Mercator projection. This article develops a simple graphical method of plotting great-circles for any point on the earth's surface, having specified the latitude of the point and the great-circle bearing. The technique is then further developed to determine the position of the solar terminator at any time.

GREAT-CIRCLE BEARINGS

The generally accepted method of determining great-circle bearings appears to be by using the equidistant azimuthal chart 1,2. However, this has several distinct disadvantages, namely:

1. Available charts are centred on selected points only, and these are generally few and far between.
2. Distortion around the perimeter makes pin-pointing difficult.
3. Fine map detail is lacking.

The use of a globe overcomes the first two difficulties but fine detail is expensive to obtain and considerable manipulation is required to obtain readings

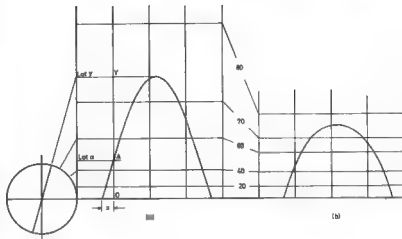


Fig. 1b—
Mercator's projection.
Horizontal scale varies as sec
latitude.
Vertical scale varies as sec
latitude.
Therefore bearings are correct at all
points.

A line having bearing "b" will have slope cot b on Mercator's projection and (cot b . sec latitude) on the simple cylindrical projection.

Consideration was therefore given to what could be done with the widely used wall-type map based on Mercator's projection Fig. 1.

In the simple projection — Fig. 1a — the horizontal scale varies as the secant of the latitude while the vertical scale varies as (secant)² of the latitude. In the Mercator projection — Fig 1b — the horizontal and vertical scales both vary as the secant of the latitude so that bearings are correct at all points on the map, hence its wide use in navigation.

The simple projection, however, has the characteristic that any great-circle projects as a sine curve symmetrical about the equator. This provides the basis for a fairly simple calculation to define a particular great-circle, having given its bearing at a particular latitude. (See Appendix)

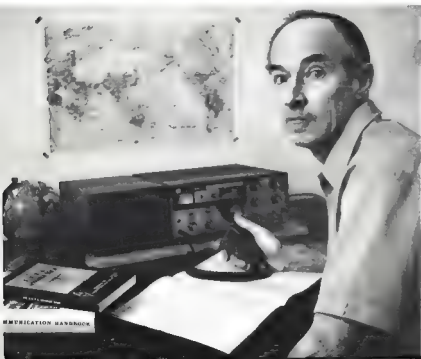
Given point A whose latitude is "a" and the great circle whose bearing at point A is "b", then the values of "y" (the maximum latitude of the great circle) and "x" (its equatorial intercept with respect to A) are found to be

$$y = \arcsin \sqrt{(s^2 + \tan^2 a)}$$

$$x = \arccos (s \cdot \cot y)$$

$$s = \cot b \cdot \sec a$$

Values for "x" and "y" were first calculated as in the appendix, but this method is tedious unless one has access to a desk calculator. With a little more thought and the help of Pythagoras, the relationship shown in Fig. 2 was discovered.



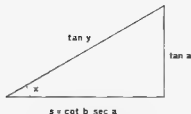


FIG. 2

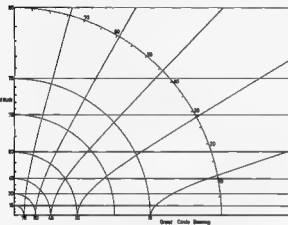


Fig. 3—Universal Great-Circle Calculator

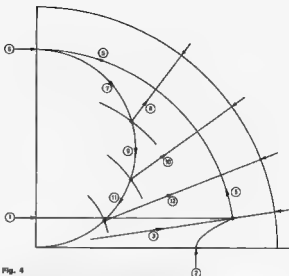


Fig. 4

- 1 Enter latitude of the reference point. (35 deg.)
- 2 Enter bearing of the desired great-circle. (18 deg.)
- 3 Project from origin through intersection of 1 and 2.
- 4 Read off angular value of x . (18.5 deg.)
- 5 Describe a circular arc from intersection of 1 and 2 to the vertical axis.
- 6 Read off latitude value y . (77.5 deg.)
- 7 Construct a semicircle on the vertical axis and note point of intersection with next significant latitude circle. (Lat. 75 deg.)
- 8 Read off angular value of x' for Lat. 75 (54 deg.)
- 9
- 10 Read off angular value of x' for Lat. 70 (36.5 deg.)
- 11
- 12 Read off angular value of x' for Lat. 60 (22 deg.)

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TABLE 1

Degrees longitude from 0600 or 1800 hours to Solar Terminator at latitude shown.

Latitude	Days from equinox					
	15	30	45	60	75	90
20	2.3	4.4	6.4	7.9	8.8	9.1
30	3.7	7.2	10.2	12.5	14.0	14.5
40	5.6	10.5	14.9	18.4	20.6	21.4
50	7.7	15.0	21.4	26.6	29.9	31.1
60	11.2	22.1	32.1	40.6	46.5	48.7
65	13.8	27.7	41.1	53.6	63.9	68.5
66.4	-	-	-	-	-	90
67.3	-	-	-	-	90	
69.4	-	-	-	90		
70	17.9	36.6	57.4			
73.0	-	-	90			
75	24.7	54.0				
77.8	-	90				
80	39.5					
83.6	90					



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EXAMPLE

For a point at Latitude 35 degrees, compute great-circles with bearing increments of 15 degrees.

a = 35 deg.	tan a = 0.7002		tan ² a = 0.4903			
b	15	30	45	60	75	90
cot b	3.732	1.732	1.000	0.577	0.268	0.000
sec a	1.221					
s = cot b . sec a	4.556	2.114	1.221	0.705	0.327	0.000
s ²	20.757	4.471	1.490	0.497	0.107	0.000
s ² + tan ² a	21.247	4.961	1.981	0.987	0.597	0.490
tan y = $\sqrt{s^2 + \tan^2 a}$	4.609	2.227	1.407	0.994	0.773	0.700
y	77.7	65.8	54.6	44.8	37.7	35.0
cot x = $\frac{s}{\tan y}$	0.988	0.949	0.867	0.709	0.423	0.000
x	8.7	18.3	29.8	44.8	65.0	90.0

Intermediate points on each of the above curves can then be calculated by using the relationship $\tan a' = \tan y \cdot \sin x'$
e.g. For great-circle bearing 015 deg.

a'	20	40	60	65	70	75
tan a'	0.364	0.839	1.732	2.145	2.747	3.732
tan y	4.609					
sin x' = $\frac{\tan a'}{\tan y}$	0.079	0.182	0.376	0.465	0.596	0.810
x'	4.5	10.5	22.1	27.7	36.6	54.0

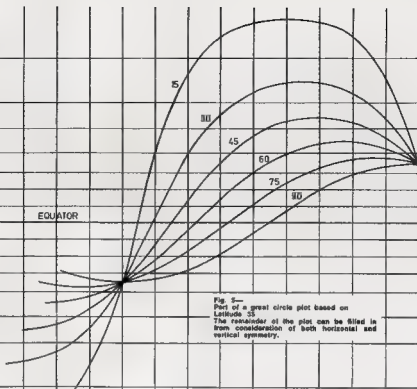


Fig. 5—
Part of a great circle plot based on
Latitude 55.
The remainder of the plot can be filled in
from consideration of both horizontal and
vertical symmetry.

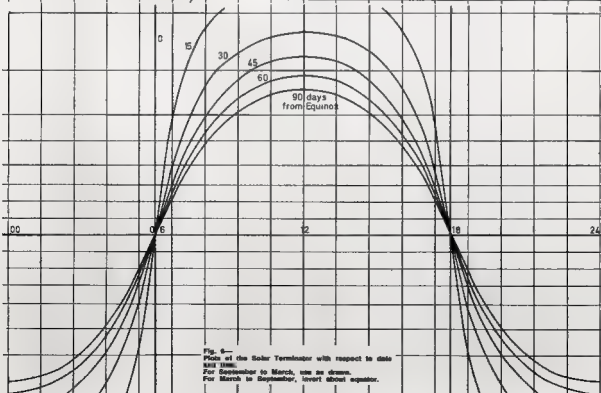


Fig. 6—
Plots of the Solar Terminator with respect to date
and time.
For September to March, use as drawn.
For March to September, invert about equator.

The complete plotting data can be summarised as follows:

Latitude	Longitude from equatorial intercept - x'					
a'	b = 15	30	45	60	75	90
10	-	-	-	10.2	13.2	14.6
20	4.5	9.4	15.0	21.5	28.1	31.3
30	-	-	-	35.5	48.3	55.5
35	8.7	18.3	29.8	44.8	65.0	90
37.7	-	-	-	-	90	
40	10.5	22.1	36.6	57.6		
44.8	-	-	-	90		
50	-	32.3	57.9			
54.6	-	-	90			
60	22.1	51.0				
65	27.7	-				
65.8	-	90				
70	36.6					
75	54.0					
77.7	90					

APPENDIX

In Fig.1 let the earth radius be the unit of length and assume the earth to be a perfect sphere.

Then $OY = \tan y$

$$OA = \tan a = \tan y \cdot \sin x \quad \text{-----}(1)$$

Let $s = \text{slope at A}$

$$\begin{aligned} s &= d/dx \tan y \cdot \sin x \\ &= \tan y \cdot \cos x \\ s^2 &= \tan^2 y \cdot \cos^2 x \\ &= \tan^2 y - \tan^2 y \cdot \sin^2 x \end{aligned} \quad \text{-----}(2)$$

and from (1) above

$$\begin{aligned} s^2 &= \tan^2 y - \tan^2 a \\ \text{hence } \tan^2 y &= s^2 + \tan^2 a \\ \text{and } y &= \arcsin \tan \sqrt{s^2 + \tan^2 a} \end{aligned} \quad \text{-----}(3)$$

and from (2) above

$$x = \arccos \frac{s}{\tan y} \quad \text{-----}(4)$$

For a line having a true bearing b at point A

$$s = \cot b \cdot \sec a \quad \text{-----}(5)$$

This forms the basis for a universal graphical calculator - Fig. 3.

Both axes are set out as tangent scales, the vertical being calibrated to show latitude and the horizontal to show great-circle bearings. Additional curves are then plotted to give the appropriate value of "cot b sec a" at each value of latitude "a".

The calculator is used as shown in Fig. 4. Tabulated data for latitude 35 deg. obtained by calculation is shown in the appendix and very close agreement is obtainable by the graphical method.

Fig. 5 shows a part-plot of these values on a Mercator chart.

Note. In plotting, first locate the equatorial intercept with respect to the reference point. Then measure all longitude values from the equatorial intercept, NOT FROM THE REFERENCE POINT.

Because bearings are correct at all points on a Mercator chart, back-bearings from the remote end of a great-circle path can also be determined. This can be useful if the other party to a contact is not sure of his correct beam heading.

THE SOLAR TERMINATOR.

Since ionospheric propagation is dependent on solar activity, it is useful to know the extent of the solar illumination of the earth at any time. The perimeter of the illuminated area, the terminator, is also a great-circle, the location of which can be determined by the same general methods outlined above.

As the sun moves along the ecliptic, its declination and the extreme latitude of its terminator vary as follows.

Days from equinox.	Declination.	Extreme latitude of terminator
0	0	90
15	6.4	83.6
30	12.2	77.8
45	17.0	73.0
60	20.6	69.4
75	22.7	67.3
90	23.4	66.2

Using the values in Column 3 and the methods outlined above, the data in Table 1 has been calculated. From this the family of curves shown in Fig. 6 has been plotted, together with the appropriate time lines. If this data is plotted on a transparency, it can be superimposed on the Mercator map with freedom to move in the East-West direction and used to indicate the daylight and dark regions of the earth's surface and also the local time at any place.

Note: Easier readability is obtained if a master-plot is made and the appropriate curve is traced on to the transparency as required.

The above is based on mean solar time which can differ from apparent solar time by as much as 16 minutes. However, correction for the "equation of time" can easily be made in the tracing process if required.

REFERENCES

- 1 Radio Communication Handbook: RSGB Fourth Edition, pages 12.22 - 12.24
- 2 The ARRL Antenna Book Twelfth Edition, Chapter 13

Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boroonia, Vic., 3105

"S"-meters for Amateur Receivers

In February's column I discussed the value of an "S"-meter in a receiver. I suggest that you read that before getting busy on your receiver with holecutters, etc.

In its simplest form an "S"-meter consists purely of a low value milliammeter connected in the cathode or emitter circuit of one of the AGC controlled stages. With no signal input, the valve or transistor draws a certain current which diminishes in the case of a valve and can either increase or decrease in the case of a transistor. The amount of variation depends on the signal strength, although not necessarily linearly.

I will assume that you have a multimeter of at least 1,000 ohms per volt rating, as discussed in test instruments a few months ago. Fig 1 shows perhaps the simplest "S"-meter that you can install in either your home-made, bought or converted BC mental receiver. This is an external meter, in fact your multimeter, which will not be in use otherwise when you are doing any operating. R1-C1 are the already fitted cathode or emitter bias components. Some sets do not have these components and have the cathode or emitter going to ground or common. Disregarding these, it can be seen that a multimeter set to a low voltage range and connected between points A and B will register a reading with no input to the receiver.

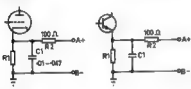


FIG 1

When a signal is received this AGC operated stage will alter its operating conditions and the current drawn will decrease with the valve circuit and a lower voltage will be registered on your multimeter. In the transistor circuit depending on whether the stage is forward or reverse biased will depend whether the current will increase or decrease, and so cause an increase or decrease in the voltage registered across R1. R2 is purely to act as an RF choke so that RF does not get radiated from the multimeter leads. An additional capacitor may be needed across A and B of about 0.47 μ F. The value of R1 depends very much on the circuit of the set in use and the actual valve type in use and could, in the case of a valve, be anywhere from 40 ohms to about 1,000 ohms. Transistor values will tend to be lower.

This is normally a backwards reading "S"-meter and has no zeroing facility. It is a cheap system and gives good relative results. One

resistor and two spring terminals would be all that would be needed, besides solder and wire.

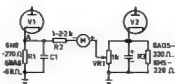


FIG 2

Fig 2 shows a slightly more elegant "S"-meter which is forward reading, has a zero adjust and can be designed so that S9 just comes to the end of the scale. For such a simple circuit this is very good. V1 is the Automatic Gain Controlled stage and V2 is the Audio Output stage. This particular circuit works on what is called the balanced bridge configuration. When there is no incoming signal the slider of VR1 is adjusted until no reading is evident on the 1 mA meter M. At this time point A and B are at the same potential so that in fact there is no voltage across R2 and the meter. Now, if a signal is received, the current drawn by V1 will reduce so that point A will drop in voltage say to one volt. There is now a voltage potential across R2 and the meter. Current will flow and cause the meter to read up the scale. How far it does read up the scale, depends on the value of R2. The value of R2 can be approximately calculated by finding out the minimum voltage present across R1 with the strongest signal you can possibly get. This may in the case of a 6N8 be perhaps $\frac{1}{2}$ a volt. In this case then the variation in voltage across R1 is $\frac{1}{2}$ volts. The 1 mA meter must read full scale then with a voltage difference of $\frac{1}{2}$ volts between point A and B.

Calculation is as follows, using $R = E$ divided by I , $E = 1.5$ V, $I = 0.001$ A $R = 1.5$ over $0.001 = 1.5$ k ohm. Therefore R2 is approximately 1.5k ohm. It could of course be made variable temporarily until the correct value is ascertained. You will of course have to calibrate this meter in some way. Probably the easiest is to divide the scale into ten segments, which it may already be, and use the normal 1 to 10 scale and call ten, S9 plus. Simple, and perhaps not considered accurate, but very few amateur "S"-meters are anywhere near accurate. At least this will be able to tell you if one station is stronger than another. It will tell you if alterations to your aerial make any difference to the reading on a known station.

To suit a 6BA6, R1 will be about 68 ohms and R2 will be about 1k ohm. Other valves will require different values again. The power output valve may not be a 6AQ5, and may commonly be a 6M5. The 6M5 has a different bias point nominally 7 volts compared to the 6AQ5 with its 12.5 volts. The position of the slider on VR1 will be different in these two cases. With a little fiddling with the values you will get the meter to read very satisfactorily.

Another simple "S"-meter is shown in Fig 3. This appears to be a circuit that suits transistorised receivers more so than valve receivers. The circuit remains the same for both valves and transistors except that the

capacitors C1, C2 and resistors R1 and R2 will be different in value. The load resistors R1 and R2 for valves will be in total about $\frac{1}{2}$ megohm. Cut off bias for most valves designed for AGC operation is in the range from 20 to 50 volts. This means that the current through R1 + R2 will vary from 40 μ A to 100 μ A maximum depending on the valve used and their AGC characteristics.

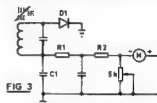


FIG 3

The disadvantage of this circuit is that in the case of valves a sensitive meter movement is needed, a 20,000 ohm per volt multi-meter on its lowest current range can be used here. The detector diode load resistors in the case of transistorised receivers are much lower and may be in the order of 10,000 ohms total. A 1 mA FSD meter may suit in these sets. The rheostat wired in parallel with the meter is used to set full scale deflection with the strongest signal you can receive. There is no zero set as with no signal there is no voltage developed across the resistors and hence no deflection. This is a forward reading "S"-meter. The value of the rheostat for valve circuits will be about 5k ohm and for transistors considerably lower. The active value of the rheostat can be measured with an ohm-meter and it can be replaced with the next lowest value fixed resistor.

SUMMARY

The preceding three circuits are simple but effective "S"-meters. If you want more of these I can oblige. Some circuits are much more complex than these, with no real advantage for simple receivers.

ODDS AND ENDS

Next month I hope to be able to give you a list of non-radio items which can be used for amateur radio construction projects. If anyone has ideas on items that can be used please write to me.

Mr Skeeny of Kaw has kindly donated an old B-C receiver for conversion into a simple 160 or 80 metre phone transmitter. Ron Fisher VK30M constructed a transmitter out of an old B-C set 2 years ago, and has volunteered to build another. So in a few months an article describing this conversion can be expected, all being well.

SEA NET

"A very highly informal but extremely effective net" is the description for the South East Asia net which meets on or near to 14.520 MHz at 12.00Z usually with Paddy, 457PB as net controller. There were two previous annual conventions of SEA net regulars and interested participants, one in Penang and the second in Bangkok. This year the SEA Net Convention takes place in Singapore on 8th, 9th and 10th November with SARTS as hosts. If you want more details why not write to BV1QIG, Ed Giral, C/o SARTS, GPO Box 2728, Singapore.

with Ron Cooke VK3AFW
and Bill Rice VK3ABP

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Commercial Kinks

with Ron Fisher VK3OM

3 Fairview Ave., Glen Waverley, 3150

This month back to our old friend the FT 200 with some notes on improving the carrier suppression.

Before this however, I have had a letter from Phil 9M2CP regarding the FT101 modifications published in this column two months ago. Phil tells me that in the time since the original publication of these notes, he has made considerable improvements to the front end performance of his 101 and that an article describing this has been forwarded for publication in 'Amateur Radio'.

I have also heard on the grape vine that there is a new model FT101 on the way which is reputed to have a vastly improved front end performance. I believe it will be known as the FT101B (see insert October 73 AR, Ed.).

The August issue of the ZL FT200 Club carried an excellent article on 'Better Carrier Suppression with the 7360', by Brian Pickett ZL2BDU.

"When first put on the air, my FT200 had one or two problems, one of which was solved by checking into the Club Net one night. The other was not quite so simple, excessive carrier made it possible to tune and load the finals without tune. The Manual was consulted and the carrier balance out as per the instructions. Local QSO's showed a carrier strength of S7 and on-the-air adjustment achieved no less than S5. To obtain this level was a nerve-racking task, just breathing on the alignment tool upset everything. Long term stability was also very poor. Obviously the carrier balance control had insufficient resolution and stability, so a Cermet 15 turn professional potentiometer was temporarily substituted and with this, 50 dB suppression was possible.

..Fine, I had exceeded the original specification by 10 dB however the theoretical maximum with the 7360 tube and crystal filter is about 80 dB and I thought I could do better than I had.

R. F. Balancing

Examination of the circuit shows that the carrier balance control is in reality a carrier amplitude control, relying on exact phasing of the RF across L105 to achieve balance with VR106. The action of VR106 is to equalise the RF voltages at the anodes of the 7360 which, if exactly in phase, should then cancel or balance out. Just how critical the phasing of the RF voltages across L105 are, can be seen from the fact that one degree of phase error will result in a reduction of carrier suppression by about 20 dB. The circuit at present has no manual adjustment for phase errors and this has led me to the obvious conclusion that L105 is factory 'tweaked' for the correct phase relationship. Actually L105 is somewhat crude for a circuit requiring component symmetry. It consists of a single winding tuned by a matched pair of 150pF mica capacitors. The output link is taken

from the top end of the coil.

..The ideal output tank would probably consist of a bifilar antenna winding with the output link taken from the centre. This was considered too drastic a modification, it had to be simple.

The simplest form of RF phase balance uses a trimpot across the output tank, so this was tried. Suppression was excellent — better than 65 dB but the 'Q' of L105 was reduced, and the receiver sensitivity degraded. This method is quite OK for frequencies generally below 2MHz.

Temporary installation of a 30pF differential trimming capacitor across L105 showed promising results, and the coil could be re-peaked with its slug to compensate for the added capacitance. Permanent installation consisted of an 'L' shaped bracket mounted with two 6BA screws on the shield partition between the main print board and the rest of the chassis. The differential capacitor was fitted onto this bracket, directly over the input terminals of L105, and a small brass shield about 1 by 3cm fitted between pins 6 and 7 of the 7360, and the input pins of L105. The shield was earthed solidly at the 7360 and L105. Permanent mounting of the 15 turn trimpot was achieved with the aid of Araldite.

Fitting the case back onto the rig and drilling a hole immediately above the differential capacitor to allow the use of an alignment tool completed the operation. The DC balance trimpot could be reached by a slim trim tool through the ventilation slots.

Alignment

If you propose to do this modification, you will need to realign the balanced modulator and L105, and will need suitable alignment tools. Metal of any kind is strictly taboo, although metal tipped tools are OK. A VTM with RF probe or a VOM with a 'sniffer' and a 68 ohm 1 watt carbon resistor as a dummy load. Initially set the phasing capacitance to half and warm up the rig for 15 to 20 minutes, with the antenna connected. Tune the transmitter for maximum RF output in the normal manner, switch to standby and after disconnecting the antenna, fit the 68 ohm dummy load and RF probe. Switch function to SSB, move lever switch to OPER, and turn the MIC gain fully off. Repeat all transmitter controls for maximum output as indicated on the VTM. Typically 30 to 100 volts initially.

DO THIS QUICKLY Using a metal tipped tuning tool (the differential capacitors are hard to turn), repeat L105, adjust the phasing capacitor for minimum RF and then the DC amplitude control for minimum, and so on. It may be found that it is necessary to unbalance with the phasing control and rebalance with the DC control VR106. Care and patience is necessary. Eventually a point will be reached where minimum carrier is obtained, the final adjustment is quite critical, requiring only small changes of the phasing control to achieve balance. When completed typically less than 25mV of carrier should be obtained and in my case slightly better than 73dB of suppression was obtained. Long term temperature stability appears to be excellent.

Points to note.

The alignment must be completed with the

cover on, and L105 repeated. The replacement of VR106 with a 15 turn Cermet trimpot can effect a very worthwhile improvement on its own. Cermet is the name given to the type of resistance element in the trimpot, and is not a brand name. Don't remove L105; placement of components within the can is critical. The capacitor is a Jackson Bros, type 701".

YRS

with Bob Guthrielet

Methodist Manse, Kadina, S.A., 5554

Club Leaders should be aware of the value of publicity for the W.A. Youth Radio Club Scheme, and how possible organise a Publicity Officer to make news available to their local press, a personal interview with the editor of any community Newspaper will be rewarding to clubs that are willing to help themselves. TV and Radio will also give time in their Community Service programmes.

A news cutting sent to me shows the value of liaison between clubs and the community.

The Maidland (N.S.W.) club's theatre was agreed to provide the presentation of the 1972 I.E.E. Paper Y.R.C.S. certificates and prizes won by members.

Guests included: Mayor of Maidland A.M. Noel Unicom, and Mrs. Unicom, representative of District Electronic Engineers Mr. C. Cowan, District Radio Inspector Mr. F. Hinks, Member for Peterson, Mr. F. O'Keefe, president of the Hunter branch of the Wireless Institute, Mr. J. McEwen, representative of NBN Channel 3, Mr. R. Prout, secretary of West Lakes Radio, Mr. E. Brockbank and Mrs. Brockbank, Miss Rhonda Eddy (Miss Newcastle and Hunter Valley 1970) and club leader of the Goford Y.R.C.S. Club, Mr. G. Proctor, and the Officer-in-charge Maidland Police Sub-District, Inspector N. Bowden who addressed the gathering.

The reader of this may say, "Well, that's fine for Maidland, but how can it help my club?" My answer is, "Have you been to get publicity? If you haven't, you don't know." Those who have travelled in the Holy Land will recall the River Jordan with its tributary in the hills of Syria and travelling south reaches the Sea of Galilee which in turn passes it further south until the river reaches the Dead Sea, and here it stops. The Sea of Galilee receives and gives, and is alive with vegetation and fish; the Dead Sea receives and keeps, and because of this it is dead. To my mind, that is a fair description of some clubs. If members are not active but give nothing Y.R.C.S. is a movement of youth and for its future to be assured there must be a vital giving of time and talents, on the part of all concerned. To say, "that's all the time I can spare" is a good enough answer.

From the aspect of publicity, which I receive very sparingly from most of the States, it would seem that little movement is taking place, and that points to stagnation. It has been suggested to me by club members that to publicize Y.R.C.S. is to invite difficulties. In that we couldn't find the necessary instructions for an increased club membership, my reply is that by increasing membership we shall create a demand for help, and without that situation the scheme can hardly go ahead. In the business world it is necessary to see the demand and then supply the product. Y.R.C.S. has the product and it's a good one. In a recent daily newspaper I read that the 1970's would see greater use of electronic devices and other forms of technology in schools. To this area of activity we must address ourselves and be the first to be up and doing something about it. With a few weeks I shall be asking State Supervisors to report Club statistics. There is still time for upgrading the 1973 figures.

YRS OF VICTORIA

Frank Whitton, VK3BAN reports that he has taken over the work of State Supervisor YRS of Victoria with effect from 1st October, 1973.

Frank requests that correspondence and enquiries concerning WIA Y.R.C.S. of Victoria should be addressed to him at 204 Churchill Avenue, Braybrook, Vic. 30319, telephone number 311-0819 Monday to Friday 0900-1700 hours.

All Victorian school and other Y.R.C.S. radio clubs should write to him forthwith to initiate various formalities and to confirm both their registrations and their requirements of notes, certificates, etc.

Contests

with Peter Brown VK4PJ

Federal Contests Manager, G.P.O. Box, 638
Brisbane, Qld., 4001.

1973 REMEMBRANCE DAY CONTEST RESULTS.

VK3 tightens its hold on the Remembrance Day trophy.

VK3, with some help from VK8, very successfully carried out their plan to retain the RD trophy for 1973. Teamists tried hard but the massive score from VK8 was too much to overcome.

VK1 led in highest average of top six Logs and also in participation. Now get out your pencil and paper and do some figuring as to what is required next year. Whatever you decide is necessary to win the trophy will have to include some detailed planning and organisation. This is the year that the VK3 fraternity showed their ability with some effect. Note the number of VHF scores, generally the point score is close to the number of contacts, in VK5, 6 and 7. Apparent to me was the number of HF operators who also scored many single points on VHF, realising that every VHF contest was two points to their taste.

Congratulations to VK8 on a job very well done. Did we make 700 Logs???

Yes we made the grade with a total of 709 Logs. Including SWL's logs. Thanks to those who participated and helped us on the upward path.

You must be pleased that you helped achieve the goal.

There were many missing this year who will have the opportunity to help us achieve next year's goal.

BUT Most Important!!!!!!

I received a record number of comments and a record number commented on the friendly atmosphere of the contest.

The simplest comment, on a scrap of paper, seemed to me the most heartfelt and I give it to you.

"A very lovely contest. God bless you all"

We can be very proud of our contest... all help with it next year. Many Logs had the other contacts name written in. If you have time to exchange names it makes a more friendly contest.

Look out here are some breakers.

Over 700 Log files I asked for them about 3000 sheets of paper, a September deadline to get results in November Amateur Radio, and I get

2. A high percentage of Logs without a front page.

3. A high percentage of Logs without any details anywhere.

4. About seven Log without any scoring.

My heartfelt thanks to the VK3 gentleman who prepared so many front sheets and made my job so much easier.

If you expected me to correct 1, 2, 3... you were right... I was determined that we make a success of the contest.

Again my compliments to so many, generally HF scores, who typed and printed copy book logs.

DETAILS OF DIVISIONAL SCORES AND PLACINGS.

Divisional Log Licensee Participation Top 6 Points Score per cent age average

VK5	9	154	788	19.3	1471	47096	10568
VK7	0	67	227	28.5	1815	21582	7985
VK4	9	127	839	18.1	1301	35994	6749
VK1	5	145	2162	8.7	1415	42987	4298
VK3	36	516	16.8	872	17874	4298	
VK2	92	2012	4.5	870	22617	1904	

In detailed scores the first figures are the points score and the second contacts made.

Divisional sectional leaders logs are subject to further checks.

Log from VK5UF, 30 points and 8 contacts, and VK3CZ, 1323 points and 431 contacts were not included in the Divisional results but do not affect them markedly.

STATE SCORES

VK1
Phone

MP	1218	567	14	286	127	HR	55	34
GA	1086	425	RA	204	114	ZGC	30	30
NS	657	288	LF	128	82	ML	11	11
JR	544	201	ACA	118	71	ZAR	8	8
YC	288	157	MF	60	25	VK	8	8

CW	VP	262	72	Open	1974	434	VK4
LO	148	74	ADP	903	404	Phone	
DC	116	56					

VK2	BWS	1700	581	BRL	218	83	UJ	72	21	EW	1804	611	PJ	186	63	FE	81	15
Phone	ASD	1579	621	RHD	193	58	AM	89	19	RH	1406	420	AK	178	50	ZAY	47	48
	XT	1448	505	BKG	183	60	ZCT	89	89	ED	1055	488	EF	178	50	HN	43	10
	DM	1186	418	VU	173	52	ZSG	65	65	OW	88	35	PN	114	35	ZTK	47	48
	DW	1138	407	AJA	168	42	AYT	63	20	CV	580	190	ZAP	104	52	OW	42	12
	AGF	845	274	CM	108	41	BLK	80	21	IE	578	292	AF	111	39	NO	38	12
	BKM	807	279	MR	167	41	OH	58	14	PS	549	201	UJ	101	101	OT	35	12
	BKN	738	299	WD	160	52	CH	58	15	JS	509	189	LB	93	38	ZNH	28	28
	AGC	712	267	AGS	160	85	CB	57	26	JS	485	118	RL	83	38	NE	22	11
	BON	674	296	WV	146	50	CJ	86	39	RL	403	121	VS	80	38	EH	22	11
	AYJ	637	235	AYN	145	51	AWX	48	17	NO	388	126	DF	83	23	ZHK	21	21
	ZA	567	190	CF	136	32	AHH	48	21	GD	388	126	DF	81	31	ZFA	18	18
	AWP	551	172	BYT	120	23	ZDR	42	42	UZ	347	106	AT	78	28	GF	18	18
	AWN	437	157	SC	120	23	ZDR	42	42	UZ	347	106	AT	78	28	GF	18	18
	EJ	463	180	WT	118	38	XD	38	12	UP	313	118	QC	66	25	ZEA	18	18
	VG	386	102	RU	114	23	AEC	37	18	UP	313	118	QC	66	25	ZEA	18	18
	BOB	372	180	SW	114	23	AHA	36	11	DZ	289	101	JZ	66	20	BO	16	16
	APD	352	127	RF	113	30	ZL	34	38	QA	267	98	OD	66	38	ZTL	16	16
	BLS	345	131	BUC	108	25	BGG	35	9	QA	267	98	OD	66	38	ZTL	16	16
	AUL	321	103	ASJ	103	23	ZVN	35	15	LN	258	84	ZJZ	57	57	OT	13	8
	AJU	275	89	GV	101	29	ZVY	27	27	XG	256	97	HJ	55	25	ZDG	9	9
	AND	275	89	GV	99	30	CAL	25	21	GI	246	79	RO	55	29	JO	8	8
	BLM	274	118	GO	88	35	BVS	23	20	GI	246	79	RO	55	29	JO	8	8
	MXC	271	101	BGX	97	25	AVR	17	17	OX	228	86	DV	60	22	OS	8	8
	ACD	256	85	APA	94	26	ZMO	15	15									
	BBI	256	85	APA	94	26	ZMO	15	15									
	CB	221	62	BHS	80	30	ZWL	7	7									
	LW	219	54	GT	77	30	AO	6	6									
	AJX	218	96	CU	76	22												

Open

CA	1357	488	BZX	443	184	RJ	243	72	Open	1275	453	UA	663	210	BZ	53	18
BO	781	293	JO	368	115	RPR	212	72	HE	1118	331	PM	342	101	CA	80	25
BT	682	256	JA	264	93	HJ	108	25	UX	1099	341	RT	273	102	VA	47	18
BMM	682	256	AAC	260	100	AJZ	101	31	UX	1099	341	RT	273	102	VA	47	18
AWH	609	203							LT	595	315	PT	206	63	FJ	43	13
									XY	580	184	GS	138	63			

CW

CK	586	211	AV	218	92	SI	58	20	Receiving	1245	V. Lennah	505-192
GR	611	197	20	202	34	LM	58	63	W. Whitrow	771	K. Cunningham	438-167
BF	437	173	JY	145	63	ZC	52	20	H. Grau	506-198	A. Macpherson	189-66
HW	423	143	BBS	136	61	IV	61	24	A. Downey			
BN	281	103	JM	93	47	AKC	19	12				
VNA	285	105	XQ	88	40	AND	16	6				
BHO	263	104	VM	79	27							

Receiving

J. Varnette	1016	227	R. Sulcas	658	Open	1275	453	UA	663	210	BZ	53	18
J. Hillard	987		S. Dwyght	610	HE	1118	331	PM	342	101	CA	80	25

VK3

Phone

AYF	881	409	ZD	240	110	AFW	121	51	QX	1700	850	AX	278	104	JB	88	20
VYK	905	328	HT	240	117	AKZ	102	19	BI	1585	650	CE	285	108	VB	67	30
ADW	746	309	KR	238	120	WQ	86	26	NC	1393	603	MF	282	75	ZBU	67	67
BOL	738	295	HC	222	52	AVP	168	29	WT	1131	404	RR	254	85	LO	88	17
BDL	628	222	JJ	218	78	LY	83	35	FW	833	308	WM	254	100	MA	86	23
ZY	641	290	BJS	206	88	YBS	67	67	AF	1038	308	GZ	208	78	GO	63	18
APV	551	220	AKC	184	118	NZ	82	32	PH	948	370	ZCP	207	207	20	85	27
AKC	550	252	AUQ	176	107	JK	86	29	GM	878	317	FO	200	82	GV	50	15
RV	478	222	ZJ	174	74	LY	83	35	QV	832	288	CY	151	181	CT	36	36
EF	476	210	ASE	171	89	AFI	60	44	LM	724	250	ZJG	150	150	KS	43	13
YD	476	175	OH	169	55	GS	48	27	OH	689	290	ZEG	121	121	AC	42	18
DS	428	148	OZ	162	52	YF	47	22	QV	832	288	CY	151	181	CT	36	36
KK	370	145	YAP	146	146	YAP	44	14	LM	724	250	ZJG	150	150	KS	43	13
SM	338	151	WM	143	53	ZRG	39	40	LP	621	217	FL	111	29	WF	36	36
BCT	330	155	AGJ	140	118	ZVZ	26	26	LP	615	210	RI	111	48	GF	34	10
ALK	324	181	OY	132	54	KS	22	7	VB	592	113	ZKT	104	104	MC	30	12
ANP	314	120	ASV	120	70	YFL	16	18	VB	592	113	ZKT	104	104	MC	30	12
HE	288	120	AAM	122	72	RN	12	7	ST	491	172	ZJG	100	100	ZN	30	30
BFN	260	122	EG	125	37	ZOC	3	10	ST	491	172	ZJG	100	100	ZN	30	30
						ZTA	7	7	UC	488	150	ZAG	83	83	ZJF	20	28

CW

Phone

AYF	533	247	CM	184	85	NK	86	47	UT	488	202	ZBC	83	94	ZJF	20	28
XB	527	224	20	142	82	YFL	16	18	UT	488	202	ZBC	83	94	ZJF	20	28
YJ	279	122	JK	132	61	AXQ	63	20	UT	488	202	ZBC	83	94	ZJF	20	28
YK	242	110	RJ	122	58	BRC	68	24	UT	488	202	ZBC	83	94	ZJF	20	28
ADW	230	117	ABR	117	60	XV	32	17	ZK	379	151	LC	71	27	MK	18	18
ARV	208	108	ARV	91	40	OF	7	5	HI	379	151	LC	71	27	MK	18	18
ARIK	197	101							HN	349	151	CA	71	27	MK	18	18

OPEN

Open					
EN	1144 422 GP	412 151 RK	157 58		
MM	772 237 OT	387 110 KJ	138 80		
RG	543 207 IF	118 126 CR	75 37		
PH	506 164 ZF	196 82 RC	124 62		
FM	506 202				

Receiving					
R Whitford	1664 527 D Minchin	73 170			
M Diddan	640 213 R Edmeades	62 131			
C Collins	367 151 T Hanneford	10 10			
C Fortham	198 84				

VK8 Phone					
KG	1384 545 AN	209 82 TP	66 49		
GA	918 415 ZHR	209 209 GR	64 29		
BS	876 350 MD	204 64 VF	63 63		
KY	766 335 OD	178 84 WH	63 63		
VP	724 283 ZJO	174 174 BO	61 21		
ZZ	654 127 ZGZ	166 167 NA	57 19		
JR	586 227 AO	191 61 MB	57 26		
VW	411 155 HE	150 51 RD	40 34		
RL	395 153 ZKW	128 128 JA	34 16		
NM	328 124 ZWJ	128 128 LF	33 33		
NY	311 110 C	121 65 DD	31 13		
BY	308 182 VK	107 38 PD	31 31		
HU	273 192 KC	108 33 ZFF	31 31		
ZDG	264 284 ZHJ	103 106 CH	30 9		
CR	180 108 ZW	86 42 KC	25 12		
WL	258 101 ZKW	83 93 WD	24 19		
NE	257 168 WJ	89 89 PX	20 13		
DD	256 124 AWI	88 88 KU	16 7		
WY	261 94 KY	86 44 LT	12 7		
WU	242 55 XX	81 27 ZKY	9 9		
SH	233 172 XV	76 35 ZK	7 8		
ZHA	233 233 ML	75 25 FN	5 5		
ZOA	230 232 AR	73 29			
TA	223 88 PP	67 31			

CW					
WT	498 184 RS	285 177 GA	22 10		
CT	482 193 CF	80 26			
BC	488 190 WA	33 15			

Open					
MA	1185 517 QJ	325 180 DW	42 14		
RJ	621 274 HK	323 101 LE	21 10		
EB	556 222 CR	96 40			
ZE	370 164 DW	96 40			

Receiving					
T McGrath	1107 403 G Allen	171			
R Edwards	644 335 D Hides	138 47			
C White	456 87				

VK7 Phone					
AZ	1521 631 ZE	222 232 ZLH	71 71		
JV	1404 628 EM	232 105 ZW	58 58		
MS	978 426 ZBY	205 205 AB	48 30		
MX	730 316 ZSF	201 202 RX	46 10		
NR	693 408 SR	231 107 HE	45 45		
LH	552 339 BE	195 94 CT	43 20		
BR	476 284 ZQG	172 172 AX	25 25		
KH	441 157 ZGJ	164 154 TT	23 23		
ZIF	400 402 FF	163 143 AJ	20 8		
OH	381 217 JZ	143 143 ZJG	18 18		
GW	372 106 ZAQ	143 143 JO	14 14		
KK	320 181 ZLD	139 139 JD	10 10		
MD	280 240 ZMF	138 139 ZL	10 10		
FB	279 177 BK	102 102 ZBE	8 8		
NJ	268 125 AW	119 104 NZ	8 8		
WH	263 149 ZFR	117 117 ZX	8 8		
LS	253 160	78 78			
BM	236 107 JZ	75 75			

CW	Open	Receiving			
CH	408 181 KJ	1533 681 R J Everett	975		
GV	226 100 SS	1223 612			
RY	205 119 AL	723 214			
BJ	110 41 RH	544 308			
CIC	60 25 UP	218 120			
JL	25 15 LZ	143 54			
VB	26 18 K5	27 27			

VK8 Phone					
CM	1085 410 JS	156 72 KK	1095 738		
ZB	608 235 AZ	87 30 ZZ	519 210		
DI	527 207	DU	440 146		
KP	388 157 CW				
HA	219 83				

VK9 Phone					
GA	943 308 FV	411 131 EJ	656 233		
RY	903 284 CH	212 83			
ED	874 223 KA	141 43			
FM	655 196				

VKQ Open					
WW	3032 584				

New Zealand Phone					
ZL2AH	768 300	ZL2AC	697 157		
ZL3ABC	692 198				
ZL2AUP	583 305				
ZL2CP	512 112				
ZL1AGD	439 223				
ZL2HE	257 123				
ZL4CA	203 30				

Open					
ZL2ACP	590 152				
ZL1AMM	223 108				
ZL10B	204 107				
ZL13V	178 101				

ROSS HULL MEMORIAL VHF-UHF CONTEST 1978-1979

Now that you VHF chaps have shown that you can really get into a contest what about making the Ross Hull a smashing success??? All you do is get on the air, make a few contacts and send in a Log. Your participation will make the contest a success.

The target for the coming contest is 200 Logs - the number you gave numbers last year, but only 40 sent in Logs.

You could exceed 200 Logs with the greatest of ease by just trying. Come on VKs 2, 3, 4, get going.

JOHN MOYLE MEMORIAL NATIONAL FIELD DAY

Now is the time to obtain and/or try out your 'putt putt' for the second week-end in February.

CONTEST CALENDAR

November 3rd and 4th R S G B 7 MHz phone
November 11th Czechoslovakian Contest
November 24, 25th CQ WW DX CW contest
December 7th Ross Hull Memorial VHF-UHF Contest
December 22nd, 23rd Hungarian Contest
February 9th, 19th John Moyle Memorial National Field Day
February 24th Central Coast Amateur Radio Club Field Day

Some CQ Contest results

VK2BK	948388	1200	90	158
VK2GW	277344	667	61	83
VK3RX	653020	1078	79	127
VK3J	94416	246	38	38
VK3APH	78660	308	30	60
VK3RJ	128898	559	25	51
VK4AK	576	20	9	7
VK6AJ	1247	17	14	15
VK6CT	36984	189	28	41
VK6HD	5956	94	16	22
	54	4	3	3

Multi single operation
VK4VU 621712 1094 72 124

CZECHOSLOVAKIAN CONTEST

November 11th 0000 GMT Sunday to 2400 GMT Sunday 11th

Participating stations work stations of other countries. Contacts of same country multiplier only no points.

All bands. No cross bands or mode.

Exchange Phone: 4 numbers. RST report plus ITU zone number.

CW 5 numbers. RST plus ITU zone number.

Scoring: One contact per band per station. One point per complete contact 3 points per Czech station contact.

Multipliers: The sum of ITU Zones from all bands.

Categories:
A. Single on all bands
B. Single on one band
C. Multi on all bands.

Any assistance makes the station a multi op.

Separate Log for each band.

A Column for points and also ITU zone (first station only).

Usual front page with details, including declaration.

An award for 100 "1st" station contacts.

Log to The Central Radio Club.

Post Office Box 69, Prague 1, Czechoslovakia.

Afterthoughts

The VK-ZL-Oceania DX Contest 1972 Results printed on page 20 of August 1973 A R accidentally omitted the following two scores under VK-Phones

Call	80 40 20 15 10				
2ABC	---	---	---	---	5235
2ASI	---	---	---	---	4295

Apologies to the participants concerned.

Ionospheric Predictions

with Bruce Bathols, VK3ASE

The Predictions listed below are obtained from information supplied by the Ionospheric Prediction Service Division of the Commonwealth Bureau of Meteorology.

Times stated are G.M.T.

28MHz

VK3 to (possible 40 per cent)

6100 1000

1000 1000

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VHF UHF an expanding world

with Eric Jamieson VK5LP

Former SA SA, 5253

Torres GWT

AMATEUR BAND BEACONS

- VKO 52.180 VK0WI Macquarie Island
- VKO 53.100 VK0MA Mawson
- VKO 53.200 VK0GR Casey
- VK2 52.450 VK2WI Durant
- VK3 144.700 VK3RTG Vermont
- VK4 52.500 VK4WI-1 Townsville
- VK4 144.400 VK4WI-1 Mt. Morwell
- VK5 63.000 VK5VF Mt. Lofy
- VK5 144.800 VK5VF Mt. Lofy
- VK5 52.006 VK5VF [VK5RTV] Bickley
- VK5 52.200 VK5VF Darwin
- VK6 144.500 VK6RTV Albany
- VK6 145.000 VK6VF [VK6RTV] Bickley
- VK7 144.900 VK7RTD Devonport
- ZL 52.200 ZL0VF Danby
- ZL 145.100 ZL1VF Auckland
- ZL 145.200 ZL2VF Wellington
- ZL 145.250 ZL3VF Palmerston North
- ZL 145.300 ZL4VF Christchurch
- ZL 145.400 ZL4VF Dunedin
- JA 82.500 JA1VJF Japan
- KL 50.100 HL9WI South Korea
- HL 50.110 K05HK Marshall Islands

■ denotes an added listing this month.

In addition to the above beacons, for those new to the bands during DX seasons, the various television stations provide high level signals from time to time. Those of interest are:

- 60.750 Channel 1 from New Zealand
- 51.740 Channel 0 from Wiggie
- 61.750 Channel 0 from Brisbane
- 61.750 Channel 0 from Melbourne
- 145.750 Channel 5A from Wellington

It should be noted however, that the power of these stations is 100 kW ERP and need to be heard very strongly as a rule before amateur station signals are audible. The 10 kHz separation between the Australian stations allows for identification of the particular transmitter. Separate on frequencies for New Zealand TV Stations were published last month.

ROSS HULL MEMORIAL CONTEST

The Federal Contest Manager Peter VK4PJ writes and help with the promotion of this year's Ross Hull Memorial Contest. Peter mentions that records indicate that more than 200 VHF operators took part in a net year's contest, yet less than 40 submitted Logs! Well, that is not a very good indicator for the overall success of the contest. It is really worth running a contest on a national basis for less than 100 entrants? Isn't it possible for the VHF fraternity to give a similar display of support to that shown in the Remembrance Day Contest? Perhaps most of us are tired after the hot weather of the summer to be bothered with writing up a Log as the daylight saving worrying you, with mother on your back to get on with the gardening during all those hours after you finish work at 5 p.m.? Yes, I know I did not submit a Log myself last year, the first time for a long time that I had not, but then it is a bit difficult to send in a Log if you did not work at all and did not find the bands open to you more than previously, certainly SSB stations are workable longer than AM stations. However, there is a

What was yours?
OK That was last year. What about this year? Can we try and get 200 Logs submitted, even 100 would be fine. I can't find a way to get 200. The best way to get your Log done is to start on it as soon as the contest is over, do not put everything aside for a week or more just to have a well earned rest, otherwise most of you will never submit. Anyway, all joking aside, let us be serious about it, and see what we can do to make the Ross Hull Memorial Contest one which perhaps for several reasons need only be second in the VHF DX world.

A final point on DX in general. This year again will see a further increase in the number of SSB operators on 6 and 2 metres, and if you are able to run fairly high power, you will find the bands open to you more than previously, certainly SSB stations are workable longer than AM stations. However, there is a

place for AM on the bands, 6 metres in particular, but with many of the usual operators now set up for SSB it needs now with the AM operator to make sure he has a clean stable signal, preferably VFO controlled. If you have a drifting signal with FM on it, your days of being received by the SSB boys are very severely limited. Due to their narrow pass-band receivers, one or two attempts is all you will get, after that, on your own. Finally, for the SSB boys, if you are on a poorly set up transmitter, you can finish up being 20 to 30 kHz wide, and cause considerably more interference than you did when having similar signals (noise-vessel) on AM.

BAK UTILITIES

Word arrives via Lytle VK2AL from the Illawarra Branch of the WIA in NSW, that an EME test was made on 2-9-73 with K2UWH and W6FZJ. The signals received from K2UWH were much better than ever before and reflect the additional gain obtained by a 16 ft 28 inch dish over that from his previous 20 foot diameter dish. Here I take up Lytle's story.

We copied solid signals for several of his transmissions, peaking up to 708 or more above noise level. The first time I heard him receiving signals possibly louder than our own echoes, due to his transmitted power being much greater than ours. However, he was not copying us as well as we were getting him, probably due to our lower power. The signals from W6FZJ were detected but not good enough copy to make them readable.

A.C.T. DIVISION OF W.I.A.

A copy of Volume 1 No. 1, of *Forward* has been received from Canberra from that newly created division, and is full of news. I hope in time it will feature a VHF column as surely there must be some VHF operators still left in Canberra! I noted with interest the mention of two new amateurs to the ranks in Canberra, Peter VK1LO and Chris Davis VK1CB. Both were members of the YNCA Radio Club. Chris passed his exams at 14½ and was able to get on the air on his 15th birthday. He operates mainly CW on HF. The note at the bottom is the interesting part. VK1RD, VK1DA and VK1DC are brothers. That's quite an achievement for a family, wonder if there are any others around Australia?

FROM GEELONG

The Geelong Amateur Radio and TV Club Newsletter for September duly arrived and I was rather taken with a cleverly written piece of nonsense contained therein. This column does not often divert from the straight and narrow path of VHF but take the Editor will grant me space this time I quote:

WANTED: A reward is offered for information leading to the arrest of Eddy Current, charged with the induction of an 18-year-old coil named Inductance, found unaided, half choked and robbed of valuable volts.

This unrecalled criminal armed with a ferrite rod, escaped from Western Primary Cell where he had been clapped in rone since Faraday. With an eye to be fine, his escape was carefully planned in three phases. First, he fused the electrolytes, then climbed through the fence, despite the resistance of the wardens who resistance was too low. Finally, he went to earth in a magnetic field.

What seems most likely is that he stole an e-motor. This is of low capacity and he is expected to try to change for a more powerful one and return by a short circuit to ohm. He may offer resistance and is a potential killer. A C. Keynes-Humm Sheriff.

ATV COLOUR FIRST

Two South Australian Amateurs on 17th September established what is believed to be an Australian first with the successful combination of a two-way duplex contact using colour ATV. Marland VK5AO operated on 578MHz and Ray VK5ZFZ used 441MHz, with the difference being 578MHz, being 17.5% better than 575 on 441MHz. The differences are mainly contributed to the rather poor path over which the experiment was conducted, and the higher proportionate losses to be expected at 578, e.g. equipment inefficiency, rain, ionospheric feeding loss. Both stations use a QO60-40 in the final, and modulated Ray used a log periodic antenna, and Marland a 16 element collinear. Corner reflectors are being constructed by Ken VK5ZJIS for future experiments.

The equipment is all home built and built to commercial standards, except Ray's camera which is made by Sony. First experiments towards the final and contact were made about 7th September, and ten days later the contact was made, and has since been followed by several other similar contacts. Considerable interest is being shown in black and white and has been completed prior to this.

I am sure we all join in congratulating these two boys

for their efforts with colour ATV and hope their news of their success will stimulate interest in other people to try it as well.

SIX METRES DX

A letter has just come to hand from Bruce VK8AZ in Darwin stating that the 8 metre band opened to JA and K8 on the evening of 27th September. Bruce managed to work K8GR, JA2, JA3, JA4 and JA5 during the period from 2055 to 2230 EST. Gary VK8OI was also on and copying their signals even better. Bruce also mentions he had been listening on and off since February with no success until the 27th. Colin VK8OH has organised a 6 metre net on Thursday nights from 2000 onwards to try and encourage some 6 metre activity. The JA's commented on the fact that the Darwin beacon VK8VF is heard regularly at good strength. Bruce uses an FTD4000 FTV850 and a 4 element beam. Thanks for the letter, and would be pleased to hear from the Darwin area again soon.

GENERAL NOTES

Garry VK5KZ advises of a message from Bob VK6BE that the Mt. Adelaide IW A1 beacon on 135.5 MHz is operational again, being a little earlier than usual. This beacon is a useful indicator of band conditions between VK6 and VK5, in particular on 144 MHz. A report to hand of the possibility of a 144 MHz beacon in Darwin this season. Maybe some further news from that area may trickle through to me eventually with information on this and the proposed additions to the existing 6 metre beacon in Darwin.

That seems to be all the news for this month, so for the time being think about this. The trouble with today's radio is that it is everywhere, it is trying to climb aboard and nobody wants to get off. Until next month. The Voices in the Hills.

PROJECT AUSTRALIS

with David Hull VK3ZDH Chairman Project Australia

In early September the first sign of trouble with the battery on Oscar 8 showed in several very low battery counts on Channel 3A of the telemetry. The lowest recorded reading was 330 and operation at this level for any length of time would have seriously endangered the package. Whilst even this low level of battery caused no significant loss of efficiency, the level of voltage still being above the voltage regulators, the satellite was held off until the battery recovered. The fault was thought to be a faulty battery cell failing to charge.

In order to extend the life of Oscar 8 to the maximum obtainable it was decided to restrict the operation of the package to night orbits only. This means in future the satellite will only be on Monday, Tuesday, Thursday and Saturday nights. Operation on this schedule has already improved the battery situation and we have confidence that the present operation of the package will continue at least for the foreseeable future. AOE 1 could be pointed out that each orbit over Australia at night comes out of the daylight and thus the battery is at a charged state when used by VK Amateurs. This was the expectation that commenced capability be maintained by AOE operation over this continent will be maintained to the last.

The present estimation date for the launch of Oscar 7 is 1st, 1974. It is hoped the date is not significant. The Australian contribution to the project is a V-telemetry encoder, left Melbourne in early August and all things being well should fly in AOE 7.

A new and welcome contact through Oscar has been the first time that a New Zealander, Leung Lumput noted on CW Reports also of H5AAGN Thailand and other Asian amateurs have been noted. A complete rundown on Oscar 7 and its capabilities will be published in A8 early in the new year in time for construction and preparation of equipment for this satellite.

Around the trade

Dick Smith Electronics Pty Ltd has arranged to circulate their 64 page manual, catalogue and directory of the Electronics Industry as part of the October issue of Electronics Australia. This was included in their advertisement in A.R. for October.

Their latest news release states a press release about this circulation which numbers 45,000. A further 10,000 copies of the catalogue will be distributed they state. This is the first time such an emboldened insert has been presented in Electronics publishing and Mr. Selwyn Savers, the Advertising Manager of Selwyn's Electronics Australia comments 'While it is obviously an estate piece of marketing by Mr. Selwyn's, the catalogue will prove to be of enormous value and interest to all readers.'

20 Years Ago

with Ron Fisher VK3OM

November 1963

Twenty years ago this month, the Wireless Institute was successful in negotiating with the Post Office for the copyrights to publish the Australian Call Sign Book. The initial copyright was for a period of five years and it was expected that the first edition would be on sale during March of the following year. The Call Book has been a regular publication of the Institute ever since. Before this, a list of Amateur Stations was published in the Radio and Hobbies produced "Short Wave Handbook", and prior to this the PMG produced their own amateur call sign book.

November 1963 AR presented an interesting array of technical articles. As mentioned last month multi-band tuners were very much to the fore about this time. The Multi-Band Antenna Coupler was the subject of an article reprinted from QST. Working on the principle of the multi-band tuner, all bands from 80 to 10 could be covered with two coils and no switching.

C. J. Cook VK4CC showed us how to make a "Standing Wave Indicator for 2 shilling line test". He used two dual lons connected to either 300 ohm feeder or to coax cable. With some experience this system worked well, and even today could well be used in an emergency.

E. Cornelius VK6EC continued his "Amateur Television" series giving circuitry and details of the video mixer and video receiver.

"Western Australia Again". What else but the Remembrance Day ceremony. Top scores in the State were: VK6FL VK7KB VK3ATN VK3ZC VK5MS and VK4RT, and of those VK5MS made the top Australian score of 790 points. Although not counted in any of the State scores VK3AG turned in a sizzling 1086 points.

On the equipment front, R. H. Cunningham Pty. Ltd. announced the arrival of the new Eddystone 840 Communications Receiver. A seven tube job with one HF stage and one IF stage at 455kHz. The price £103.6-23. It covered from 620 metres to 30.8 MHz in four bands, with the usual smooth running Eddystone dial.

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

The Editor A.R.

Dear Sir,

I have just got around to reading Bill Currie's amusing article in the July issue of AR entitled "How to Succeed in Electronics". There is much in this I solemnly agree with for I too have had many failures with "modern" solid state devices — much more than I ever had over my 40 years with valves. I am learning the sorrowful lessons, and now "tuning in" as many valves and protective devices as I can muster before switching on the power to a newly constructed solid state device.

A transistor fan, Cyril Buckingham, VK3OV keeps telling me that "transistors are beautiful". Yes, like having a ravishing blonde for a girl friend. You have to tie her up hand and foot to stop her from being knocked off.

I quote the case of Law Ridding, VK3LX, who in the late 30's would be found in his Footscray shack, pounding away with "... a thousand or so volts on the anode ... of his 210 final. If his sending was slow enough you could read his code by watching the length of the glow on the 210 anode, yet this valve tested years (with an occasional "cooking" of the filament). No, they don't make them as rugged these days!

Yours etc.,

W. Russell, VK3ZUP

The Editor, AR,

Dear Sir,

I wish to draw your attention to the extraordinary letter I found in this week's Camberwell "Free Press" (28-9-73), which I have enclosed.

(The Press Cutting referred to the usual "petitions that best many residents" and "neighbours had of course objected to this is the usual heart-throb about an 85 year-old mum and her comforting TV. — Ed.)

Although the Camberwell Council is apparently trying to be fair, by enquiring among neighbours as to whether there may be any objections to the erection of a tower, one is left with the feeling that equal representation is not allowed — is the person erecting the tower able to seek proof of the complaints?

Taking the objections one by one: on what grounds are towers unsuitable in small suburban blocks? Why should adjoining properties be devalued? Because the tower is unsightly? Show me a television antenna which is aesthetically pleasing. Because the tower is unsafe? Hardly; the tower is replacing an existing one which does not meet Council specifications. To state that a tower of this sort will interfere with television reception is ridiculous. Claims like this only serve to underline the claimant's ignorance of what they are talking about. According to one claimant, the area has poor television reception. But how is the tower going to interfere with television reception? Ghosting is an explanation I find hard to believe; maybe it will act as a VHF signal-sucker. Or must the Amateur Radio fraternity continue to be the scapegoat because television receivers have an aversion to strong signals in the immediate (frequency) vicinity? Or even not immediate? Or even not harmonically related? Foeey.

The daughter of the 88 year old lady has presented a claim which defies logic to unravel it. What does she want?

Let's look at some of the arguments against the non-errection of a tower:

1 The amateur concerned — I don't know who he is; all I know is that he and I have a common interest — is just as entitled to pursue his hobby as is the 86 year old lady.

2 If the amateur already has a tower up, how can the claims against the erection of a new tower possibly be justified? On the assumption that there must already have been a Council permit obtained, were the neighbours queried as to objections at the time the permit was sought? No mention is made of this. I am led to wonder how he was able to erect his tower in the face of such opposition.

3 Is the tower to be in use 24 hours a day?

I am also upset at the biased opinion expressed by the reporter: "... there is little control over the number of petsticians ... Amateur Radio is a "fatal endemic disease" (Oxford Pocket Dictionary)? Even the heading is a downright untruth. ("Hear Towers Near TV Reception").

Finally, I am very glad I don't have the above complainants as neighbours. What a sad lot of people they must be.

Yours faithfully,
John Lilley VK3ZJL

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(\$11 for 3 years, \$15 for 3 years)	
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• Please ask for membership form	

PROJECT AUSTRALIA GREAT CIRCLE MAP is still available at 60 cents plus 25 cents postage.

WRITE FOR LISTS OF OTHER ITEMS, e.g., Ties, Badges, etc., to your Division or direct to

W.I.A. "MAGPUBS"

P.O. Box 150, Toorak, Vic., 3142

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Craftera, SA, 5152.

The following additional stations have qualified for Awards, and certificates have been issued — W A V K C A Award

Certificate	Call sign		Call sign
571	UA4HC	577	JA2DNA
572	UK0QAE	578	ZL2IK
573	UL7NW	579	G2DF
574	UW0IF	580	JA1DQT
575	9H4G	581	JASKW
576	JA4FUQ	582	G3TLV

W I A 62 MHz W A S Award

Certificate No.
108 VK1JB
109 VK4GM ex 42GA Add countries 3
D X C C

New member:
Call VK8KP Certificate No. 141 107-107

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VICTORIAN DIVISION W.I.A.

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SUNDAY, 25th NOVEMBER

to be held at

LAKE EPALLOCK

in the

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PROGRAMME INCLUDES:—

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Barbecue and Picnic Facilities available.

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QUAD HUB: \$17.25 plus P/P \$1.25

QUAD KIT: \$90.00. Freight forward, consisting of:—Hub; 12' solid F/G. Spreaders; Aluminium Extenders. Ferrules, Adaptors; 350' 0.064 Heavy Duty Copper wire; Nylon line and Insulators. Araldite (10 oz.) \$4.00 if required.

MOBILE ANTENNA PARTS:—

6' solid F/G blanks. 1/2" 1/4" \$3.00

Solid brass butt fitting, 1/2" whlt. or 3/8" UNF thread. \$2.00

Brass tip chuck \$6c

Long items must be sent freight fwd. on road or rail. Copies of March 1970 "AR" article available by sending

S A E.

S. T. CLARK

P.O. BOX 45, ROSANNA

VIC., 3084 Ph.: 45-3002

Magazine Index

With Syd Clark, VK3ABC

BREAK-IN August 1973

Marconi, The Inventor of Radio Communication: The "Crima" Repeater.

RADIO 25 June 1973

Technical Description of the NETSET.

CG August 1973

A General Coverage Solid State Communications Receiver with Direct Digital Frequency Readout; A Deluxe Screen Modulator for Beginners; Further notes on the SS Mk4 SSTV Monitor; An Electronic Timer for Less than \$5.00; Using the Surplus R-390 Repeater for SSB; FM Repeaters — A Paradox of Problems.

CG September 1973

An Integrated Circuit Morse Code Keyboard; OSCAR-Mobiling; CG Reviews: The Milida Model 6354 Mini-Multimeter; A VFO Keying Switch for ORP Operation; 1972 CG W-W. D. X. Contest Results

HAM Radio June 1973

Digital RTTY Autostart; A Complete Audio Module; FM Repeater Installation; Regulated a c Power Supply for Mobile Equipment; Microprocessor Communications Receiver; High Performance Broadband IC Amplifiers; Using the Heath SB-450 Frequency Display with Other Receivers; Logic Oscillator for Multi-Channel Crystal Control on VHF FM.

73 Magazine July 1973

Tunable Reception for 2 Metre FM; A Basic Amateur TV System; Maximum Performance for small Yagis; An Accurate Frequency Standard; A Digital Identification Unit; Mobile — and DXing too; 450 MHz Power Divider; An Experimental Comparison of CW Audio Filters; "Concerning a System to Achieve 65 dB Gain on a 2M Antenna"; Compromise Multiband Antennas; Spinoffs from NASA to the Radio Amateur; Grid Dip Tuning the Qued; FCC Rules and Regulations Part 97 (III).

For some time now I have hoped that space would become available to carry reviews of some of the 'lesser known' magazines which come to the WIA without digressing into the 'foreign' publications which require translation.

This month, as material is somewhat less than usual I propose to say a word or two about *Mobile News* published by the Amateur Radio Mobile Society, three issues of which are to hand, namely September and October 1972 and June 1973. This journal publishes technical articles and tips of interest to 'Mobiles' HF or VHF, A M or F M. The subscription rate is low and information may be obtained from R. E. Snell, VK3-BGG, OTHR. The other journal is an old friend of ours from VK7, *The Australian EES*. The last issue I have to hand is dated December 1972 and since Leo VK7RG did not publish his very interesting magazine for some months I am not surprised that he has a back log to catch up. Enquiries should be made by SAE to P.O. Box 177, Sandy Bay, Tasmania, 7505, Australia.

Ardent experimenters will find much to interest them in both of these publications.

Hamads

- Eight lines free to all W.I.A. members.
- \$5 per 3 cmt. for other amateurs and S.W.I.'s.
- Copy should be in block letters or typewritten, signed and forwarded to The Editor, P.O. Box 150, Toorak, Vic., 3142.
- Exclude commercial advertising.
- Closing date for Hamads is the 3rd day of the month preceding publication.
- QTHR means the advertiser's name and address are correct in the current Australian Callbook.

WANTED TO BUILD

Yessu FT206 complete with HD home built power supply, new 6J55B final, only 10 months old in brand new condition \$200 ONO. VK3JUT OTHR.

TCA 1674 Loband FM Mobile Transceiver, 3/20 final. Clean condition. Recently in service, unconverted. I will pack; you pay freight. \$13.00. VK4ZTK OTHR.

Philips FM806 mobile transceiver, 2ma Fm, 5 cts. Chs. A B, C, Inc. 28 W output, latest fully solid state TX from Philips, wide band filter, lone calling, reflectometer protected final, handbook and mobile mount provided; excellent unit, \$175. ONO. VK4ZML OTHR. Ph: (072) 56-3807.

Sidobank TX, E.A. Jan-Mar 1967, mech. filter type, solid state, all band \$60. **Linear-2** x 614E's \$30. **BC-348** RX \$40. **Bad** issues EA \$1-46 each.

VK2BAK OTHR. (1973 call book). Ph: (02) 48-6241. **50' 50R** Support Two Section Mast. Good cond. Base included \$90. Ph: AH (03) 53-1257.

Swan 120 Transceiver and power supply, excellent condition. What offers? VK2ASC, OTHR. Ph: (02) 451-1312.

Australian EES: Sound volumes for sale, 1971, 1972, 32 each. A few 1970 at \$2.50. VK7RG, OTHR.

2m FM Carphone, solid state, (ex AR Mar/April, 1971), 5 channels A, B, C, 1 and 4. TX 12w output. RX extremely high sensitivity. Completely designed. Perfect condition includes Belling Lee 14MHz; mod. speed S/B whip, \$195. VK3ATV, OTHR. Ph: (03) 232-0682 AH.

Video Tape Recorder Ampex Type VR650, 2 inch Helical, approx. 22 K feet of tape, 5000 O.N.O. **Teletype model 14RUD** Typing repair and TX \$35. **Vidicon 1 inch** new \$20. **Television** sidband response analyser and sweep generator type-W9S \$150.00. VK22PM OTHR. Ph: (02) 476-2304.

Heath WFO, model VF-1, 10-160 plus 11 metres \$8. R. J. Flanagan, VK3CR, OTHR. Ph: (03) 772-4039.

Edystone RX "588A" Amateur bands only. Excellent condition, 160-20 MHz with circuit and service manual, \$120.00 O.N.O. D. Johnston, c/o Prince Henry Hospital, Little Bay, N.S.W. Phone Sydney 561-0111 Ext. 239.

AWA MR8A Carphone, Channels A, B, 4, \$30.00. **Vinten BTR** 10 to 50 Watt Base Station, Channels A, B, 4, switching for four channels \$75.00.

AWA MR20 Carphone on 52.525 FM-5148 final, 35 watts—Includes crystals, \$35.00.

Alan Bradley, VK3LW, G/C Box 520, Geelong, or Ph: Mob. 341-2452 SH.

WANTED

Morse Keys, Gipsel, Simplex auto, PMG and others. Any condition, with VK455. 36 Wynnot Street, West End, Brisbane, 4101.

You and DX

Many readers turn first to this page and are disappointed to see very little in this column even though the sunset cycle is getting so low that 20M has become a day-time band, 15M and 10M are open especially during summer and many DX to be found on 40, 80 or 160 at night. This leaves aside any DX through OSCAR 6 and successors.

What is the news of impending DX-peditions, QSL addresses and the other chap's progress in hooking a new one? Or has everyone been reduced to tag-chewing with set stations on pre-arranged skeds to the exclusion of DX which is probably not there anyway? To run a DX column requires a bit of effort, intimate contact with conditions and an 'ear to the ground'. It also requires the possession of some ink wherewithal to write.

If there is no VOLUNTEER to write a regular column for AR could you, yes YOU the reader of this, put pen to paper when you feel an itch in your writing fingers? This is the kind of thing to send in so that many such paragraphs from different sources could be added together (after edit) to make up a pot-pourri column —

VK3ZT worked Fred, XXXXX on Sept. 28th on 14230 SSTV at 13.30 hours K and exchanged pictures of rare quality. Fred showed one picture of a world record catchup net down in his garden but VK3ZT caught him with his picture of the world's smallest paw-paw plucked from his very own tree. Band conditions to Africa were otherwise poor but Steve (yes, VK3ZT no less) did hear 575ITU working 575ITU on 14105 giving QSL address as 48URU.

Note the third-person usage and brevity. Write it out legibly on any old piece of paper, even a 610 note would do, but do not forget in this case to ask for a refund of the 7 cent stamp you used.

An itchy-fingered paragraph from Ken DX-chasers would make a column provided each did not write about the same choice morsel. So how about it?

The DM-OSL-Bureau has sent out a circular stating that several DM-stations will be using the special prefix OT from May Day. Declaring May Day the 20th anniversary of amateur radio sport in the German Democratic Republic.

Intruder Watch

with Alf Chandler VK3LC

1536 High Street, Glen Iris, 3146

Reference the summary published in last month's *Hamads* I now have both the *QSLB* and the *ARRL* doing similar summaries, but they have opted to do their summaries monthly and include any intruders reported by VK, so it looks as though I shall have to compile my summary monthly.

An indication of how useful they are to Members would be appreciated, and also any suggestions as to the layout and information supplied would be useful to me. The *ARRL* Monitoring System Region 1 coordinator GB2IW the following comments are appropriate, and I quote —

In view of the success of the *Intruder Watch* monthly summaries and the resultant increased distribution, the previously issued six monthly summary of intruders has been discontinued. More information has been included where possible including reports received from sources within IARU-ITU Regions 2 and 3. Every effort has been made to direct reports arising from receiver misinterpretation, through, cross modulation etc, and where possible are checked on independent receivers and antennas. With reference to the VK reports more information is returned on the following items — 14018 4CU; 14022 NAP; 14061 4CU de CL430; 14071 UMG72; 14082 7A1; 14144 BCKX (also 14153); 14345 FAL. Beam headings would also be appreciated.

If Members hear any of these stations, and can get a fix on them please notify your co-ordinator and report. The co-operation between Societies is to be commended and encouraged. By reports received it would seem that we have enriced the engineers concerned to control the spurious emission from the Full Station 3DM. This station is controlled from New Zealand, and is situated at Nadi airport.

For Reliable Connections

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Head Office: 31-41 Bourke St., Alexandria, N.S.W. 2015 and at Melbourne, Brisbane, Adelaide, Perth, Newcastle



C.G.S

TYPE C MINIATURE VITREOUS ENAMELLED POWER WIREWOUND RESISTORS

Approved to BS 9114 - N002 style 2E-56

SPECIFICATIONS

The 'C' Series of miniature wirewound, vitreous enamelled resistors has been designed to meet the requirements of Specification BS 9114 - N002, and full Qualification Approval has been granted. A Test Report Summary is available on request; this report shows that many of the performance levels are in fact much higher than the specification acceptance levels.

The use of specially selected materials, combined with the application of exacting quality control throughout all stages of production ensures the consistent achievement of a very high standard of reliability.

ELECTRICAL SPECIFICATION

Tolerance: $\pm 5\%$ is standard on values of 15Ω and above and $\pm 10\%$ between 0.15Ω and 1.05Ω . For non standard values and tolerances please consult the factory.

Resistance values: C Series resistors are available with the preferred ohmic values of the E24 Series within the ranges shown in Table 1.

Temperature coefficient: Typically less than $100 \text{ ppm}/^\circ\text{C}$ and never exceeding $200 \text{ ppm}/^\circ\text{C}$ over the category temperature range -55°C to $+200^\circ\text{C}$

MATERIALS

Core: High purity steatite ceramic. Chemically inert, capable of withstanding severe thermal shock and impervious to moisture. Ground to close tolerance finish to give maximum contact with wire element for rapid heat transfer.

Resistance Element: High quality nickel-chrome or nickel-copper alloy depending on resistance value; wound at minimum tension.

End Caps: Formed to close tolerances from a special nickel-iron alloy chosen for its consistent welding properties and glass sealing characteristics.

Leads: Solder coated nickel A.

Uncoated leads can be supplied for welding.

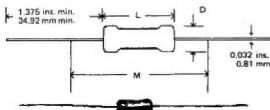
Specify - 'weldable leads'.

Preformed and cropped leads can also be supplied on request.

Coating: Humidity proof vitreous enamel with carefully controlled expansion matched to the materials of the resistor.

TABLE 1

C.G.S.			BS 9114 - N002							STYLE CROSS REFERENCE		
Style	Maximum wattage rating @ 20°C	Resistance Range Ω	BS 9114 - N002 Style	Maximum wattage rating @ 70°C	Approved Resistance Range Ω		Critical Resistance Ω	Limiting Element Voltage, Volts		DEF. 5111-1 Style	DEF 5115-2 Style	G.P.O. Style
		min. max.			min.	max.		Normal	Low Air Pressure			
C3A	3	0.1 10K	2E-56-2E	2.5	1	4.7K	3.9K	100	70	RWV3J	RFH3-25	P.O.35
C7	7	0.1 27K	2E-56-6	6	1	15K	6.8K	200	140	RWV4J	RFH3-6	P.O.40
C10	10	0.1 68K	2E-56-9	9	1	68K	27K	500	350	RWV4K	RFH3-9	P.O.36
C14	14	0.2 120K	2E-56-12	12	1	100K	47K	750	530	RWV4L	RFH3-12	-



Note: M = resistance measuring points distance - below 10Ω only.

TABLE 2

Style	Length L		Diam. D		Measuring Distance M		Approx. Weight
	max. in.	max. mm.	max. in.	max. mm.	± 0.062 in.	± 1.59 mm.	grams
C3A	.499	12.7	0.220	5.6	1.250	31.8	1.0
C7	.874	22.2	0.315	8.0	1.625	41.3	2.0
C10	1.499	38.1	0.315	8.0	2.250	57.2	3.5
C14	2.106	53.5	0.315	8.0	2.875	73.0	5.0



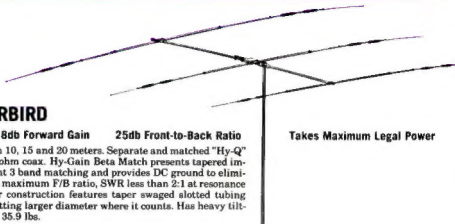
NEW SUPER THUNDERBIRD TRIBANDER BEAMS from BAIL ELECTRONICS

NEW, IMPROVED SUPER 3-Element THUNDERBIRD

- ◆ New "Hy-Q" Traps Up to 8db Forward Gain 25db Front-to-Back Ratio

Takes Maximum Legal Power

Delivers outstanding performance on 10, 15 and 20 meters. Separate and matched "Hy-Q" Traps for each band. Feeds with 52 ohm coax. Hy-Gain Beta Match presents tapered impedance which provides most efficient 3 band matching and provides DC ground to eliminate precipitation static resulting in maximum F/B ratio, SWR less than 2:1 at resonance on all bands. Mechanically superior construction features taper swaged slotted tubing allowing easy adjustment and permitting larger diameter where it counts. Has heavy tiltable boom to mast clamp. Shpg. Wt. 35.9 lbs.



FABULOUS THUNDERBIRD JUNIOR

- ◆ Up to 8db Forward Gain 25db Front-to-Back Ratio
◆ Takes up to 300 Watts AM; 600 Watts P.E.P.
◆ Rotates with Heavy Duty TV Rotator Turning Radius 14.3 ft.

If you're looking for top performance on 10, 15 and 20 meters but are hampered with severe space limitations, you'll want the Model TH3JR. Constructed of durable, lightweight taper-swaged aluminum tubing, the Model TH3JR is ideal for rooftop or lightweight tower installations. Separate and matched "Hy-Q" traps for each band. Feeds with 52 ohm coax - Beta Matched for optimum gain, maximum F/B ratio without compromise. SWR less than 2:1 at resonance on all bands. Molded high impact cycloac insulators - all hardware iridite treated to MIL specs. Shpg. Wt. 20.4 lbs.



SPECIFICATIONS

ELECTRICAL

Gain
Front-to-Back Ratio
Maximum Power Input

Model TH3Mk3

8db
25db
1 KW, AM
Less than 2:1
52 ohms

Model TH3JR

8db
25db
300 Watts AM;
600 Watts PEP
Less than 2:1
52 ohms

MECHANICAL

Longest Element
Boom Length
Turning Radius
Wind Load At 80 MPH
Maximum Wind Survival
Net Weight
Mast Diameter
Surface Area

27 ft.
14 ft.
15.7 ft.
103.7 lbs.
100 MPH
36 lbs.
1 1/4" to 2 1/2"
4.03 sq. ft.

24.2 ft.
12 ft.
14.3 ft.
87.0 lbs.
80 MPH
21 lbs.
1 1/4" to 1 1/2"
3.4 sq. ft.

TRIBANDER BALUN



60 Shannon St., Box Hill North, Vic., 3129. Ph. 89-2213

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OLD: MITCHELL RADIO CO., 59 Albion Road, Albion, 4018
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Ph. Day 657 1632

S.A.: FARMERS RADIO PTY. LTD., 257 Angus Street, Adelaide, 5000.
W.A.: H. R. PRIOR, 26 Lockhart Street, Como, 6152.

A.H.: 371 5445
Ph.: 23 1368
Ph. 80 4379